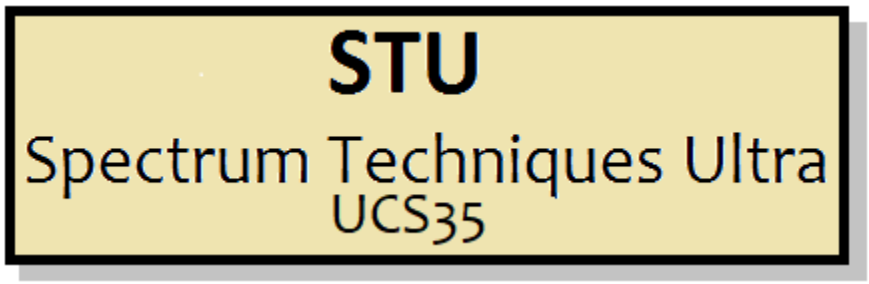
SPECTRUM TECHNIQUES



User Manual

January 7, 2026

IMPORTANT NOTE

The Universal Computer Spectrometer UCS35 software application should already be installed on your computer before you connect a Spectrum Techniques hardware device to it and power on the device. If you have already connected a UCS35 device, do not power it on until after the software installation has completed.

If you encounter difficulties during the installation process that prevent the software from successfully installing, it may be because you are attempting to install the software again after it has already been installed. Check *Control Panel > Programs and Features* on your computer to see whether there is already an entry named *UCS35Setup* that appears in the list. If you find that this entry appears in the list, then you must first uninstall *UCS35Setup* before you attempt to follow the steps in this user manual.

Spectrum Techniques, LLC
106 Union Valley Road
Oak Ridge, TN 37830

Phone	(865)482-9937	Fax	(865)483-0473
E-mail	support@spectrumtechniques.com	Web Site	spectrumtechniques.com

Contents

INTRODUCTION

The purpose of this guide is to provide you with assistance to quickly install, set up, and begin using the UCS35 desktop software application with your Spectrum Techniques hardware device. The application allows the user to save data to the PC and to use the features described in the *Using Your System* section found later in this document. The latest software version of the UCS35 software is available for download on our website at spectrumtechniques.com/products/instruments/ucs35.

Hardware

The Universal Computer Spectrometer UCS35 offers a unique solution for nuclear spectrometry using the PC platform. A 4K ADC (optional) combined with 8K of data memory and multi-channel scaling is ideally suited to scintillation spectroscopy and time-related studies such as half-life decay.

Constructed in a sturdy, bench top enclosure with Universal Serial Bus (USB) computer interface, the multi-channel analyzer contains many advanced features including computer-controlled amplifier and high voltage for PM tubes, upper- and lower-level discriminators, on-instrument data memory, and a comprehensive software package for use under Windows 10 or higher.

The UCS35 requires only an available USB port and is designed to work seamlessly with USB-equipped PCs. For stability and low noise operation, the unit has an autosensing power supply for 100-250 VAC operation. An on-board microprocessor acts as the master controller with internal memory storage, as well as the communication link directly to the USB interface.

The integrated amplifier and high voltage are fully compatible with most standard scintillation detectors, eliminating the need for special tube bases and external modules. For ease of setup and calibration, coarse gain, fine gain, high voltage, and lower- and upper-level discriminator settings are controlled directly from the desktop computer. For operation with other types of detector systems such as alpha spectrometers or single photon counting, the scintillation preamp and amplifier can be bypassed (by computer control while in the “Mode” menu) which allows direct access to the ADC.

A 4096 channel ADC with de-randomizing buffer offers excellent data throughput at high counting rates with minimal dead-time losses. Conversion gain may be changed from 4096 to either 2048, 1024, 512, or 256 channels via the desktop software. Data from the ADC is stored directly in on-board memory for high-speed operation, freeing the host computer for other tasks.

Software

The UCS35 application produces a high-resolution, real-time live color display of spectral data with standard PC graphics running under Windows 10 or higher. Operation is intuitive using pull-down menus and function buttons for the most commonly used commands and display options. The software offers full control of all features including preset live/real time and regions-of-interest, together with centroid, gross and net area calculations.

Control of the hardware amplifier, high voltage, ADC, and input discriminators is also through function buttons for straightforward calibration and operation. To simplify identification of peaks, the spectrum may be calibrated to display directly in energy units, using either a 2-point linear, or 3-point quadratic relationship calibration to allow for detector non-linearity.

Spectral files may be exported to disk for long-term storage as binary files or copied to the clipboard in ASCII format for exporting to other programs. Stored files may be used to collect background data over a long counting period that can be subtracted on a time proportional basis from the spectral data.

To aid in the identification of nuclides, the UCS35 contains a unique peak-labeling feature named ISOMATCH. Providing the unit is accurately energy calibrated, the user may select a nuclide from the library and the corresponding characteristic emission lines are superimposed on the spectrum along with isotope and energy information. Using this feature, users can easily inspect a spectrum and visually identify the emission components for each nuclide present. ISOMATCH libraries may be created or customized using a text editor.

When operating in multi-channel scaling mode, the system can be calibrated in time units for direct readout from the cursor.

Both linear and semi-logarithmic display ranges are included, which can be useful when performing decay studies

Legacy spectrum files can be transferred from the UCS30 Windows program to the UCS35 Windows version format.

Most functions may be accessed by more than one method. All the functions can be accessed from the Pull-Down Menus, some from the Tool Bar Buttons, or by the mouse. If the function has a Tool Bar Button, its symbol will be shown on the left-hand side of the description.

System Requirements

The UCS35 device supports Universal Serial Bus (USB), LAN, and WiFi to communicate with a host computer. The host computer must be capable of communication on at least one of these adapters in order for it to control the UCS35. We recommend that you use at least a Windows10 4GB x64-based processor to achieve satisfactory performance.

INSTALL SOFTWARE

You are not required to be logged in as a local administrator in order to install the software. However, if you are not a local administrator on your computer, then during the installation process the installer will ask for a local administrator password in order for it to continue. We

recommend that you either know this administrator password yourself or have available to you the assistance of someone who knows this password. The software will not install properly without this password.

Example files

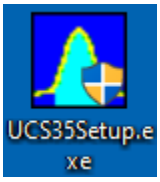
- **Spectrum (*.spu) files:**
  Normal.spu – contains an uncalibrated spectrum of CS-137.
  Calibrated.spu – contains a calibrated spectrum of CS-137.
- **Setup (*.sup) files:**
  Normal.sup – has settings used in Normal.spu.
  Calibrated.sup – has settings used in Calibrated.spu.
- **Library (*.itm) files**
  Isotopes.itm – contains common isotope peaks for use with the IsoMatch function.

Make sure the computer operating system of the PC you want to install the SpectrumTechniquesUltra UCS35 software application on is at Windows 10 or higher. The application will not run properly on versions older than Windows 10. The software operates equally well on 32-bit and 64-bit computers.

The following discussion assumes that you have already downloaded the **UCS35Setup.exe** file. If you have not, then you may obtain this file from our public website. To do this open a web browser and navigate to http://spectrumtechniques.com/products/instruments/ucs35. From here click the *Downloads* tab. This takes you to a *Downloads* webpage. Scroll down and find a line that looks like this:

Download PC – UCS35 Software

Click on the **Download** text to download **UCS35Setup.exe**. This will cause the **UCS35Setup.exe** file to download to your computer. Once downloading is complete drag the file to a convenient location on your computer Desktop. The new file looks something like this:



Double-click this file. Doing this starts the process of installing the UCS35 application software on your computer. Click the 'Yes' button on the 'User Account Control' window. You will see a new window appear that looks like Figure 2:

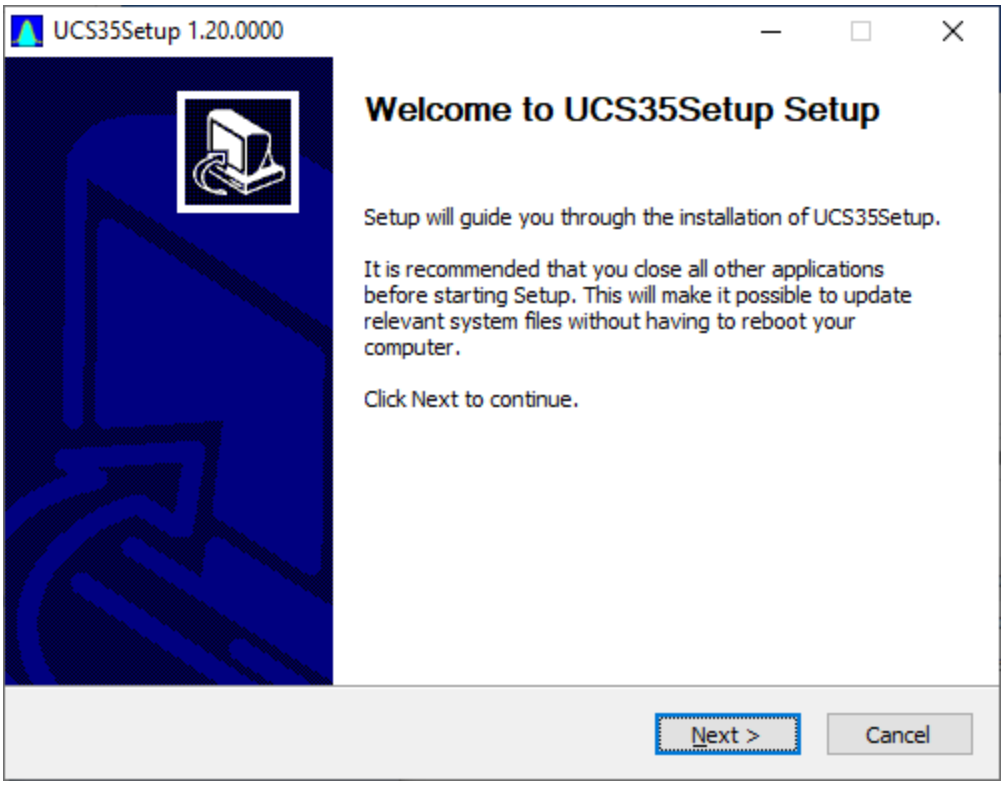


Figure 2

Click **Next**. The window changes to look something like Figure 3:

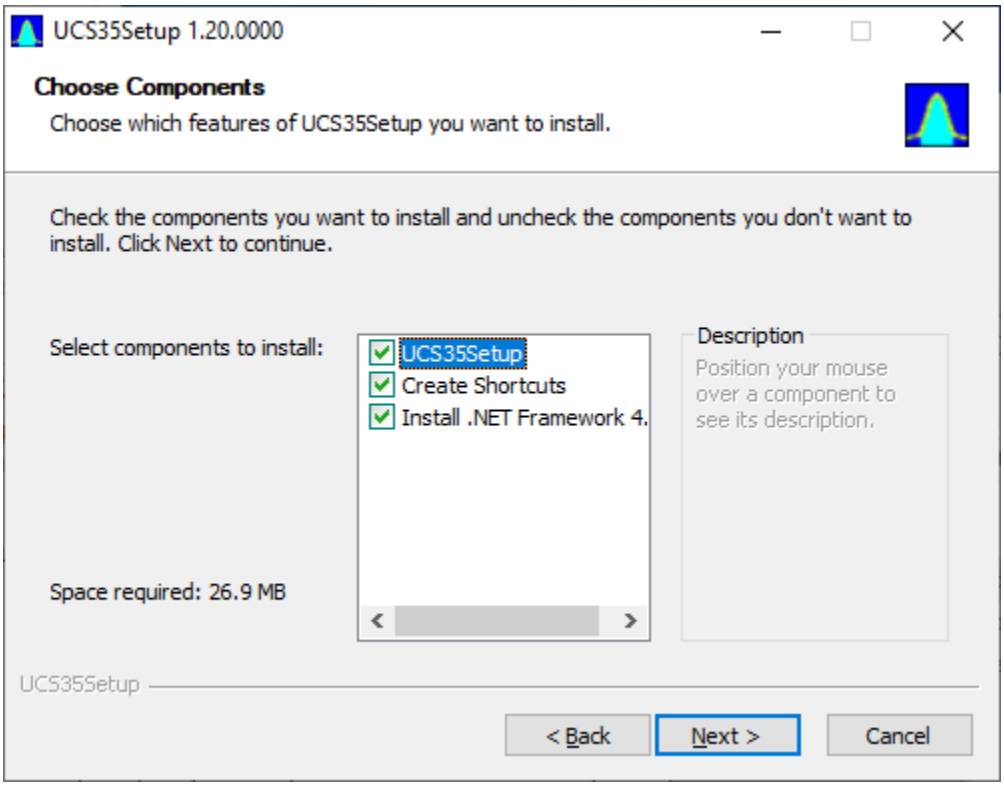


Figure 3

Click **Next**. The window changes to look something like Figure 4:

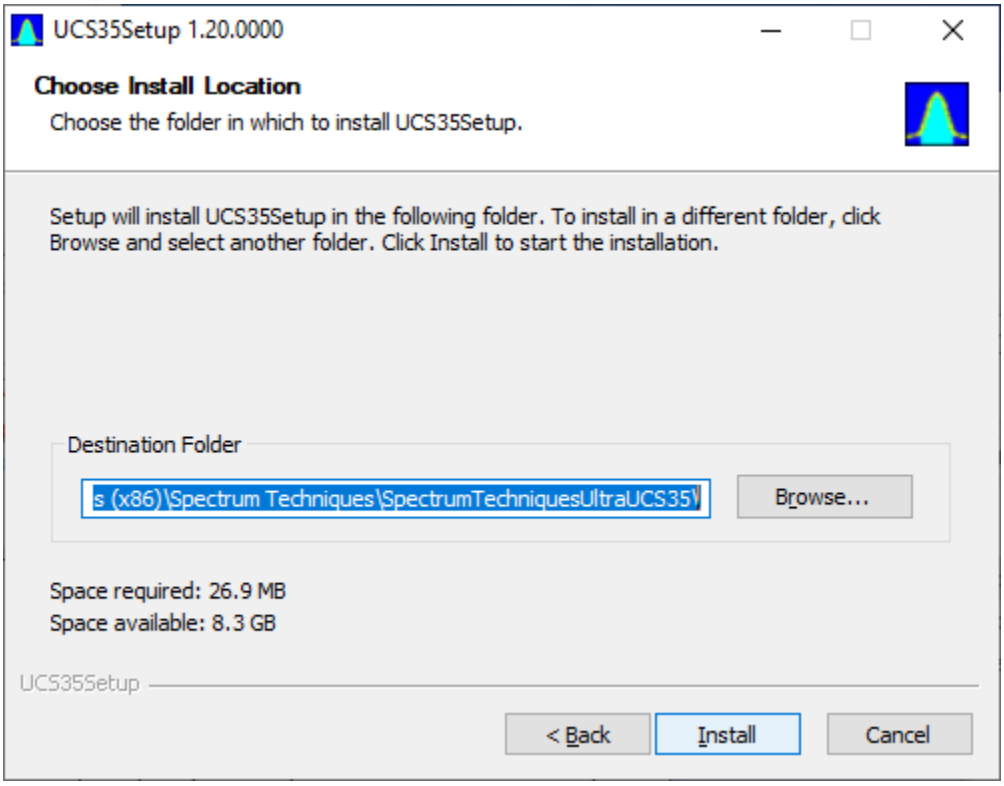


Figure 4

Click **Next**. The window changes to look something like Figure 5:

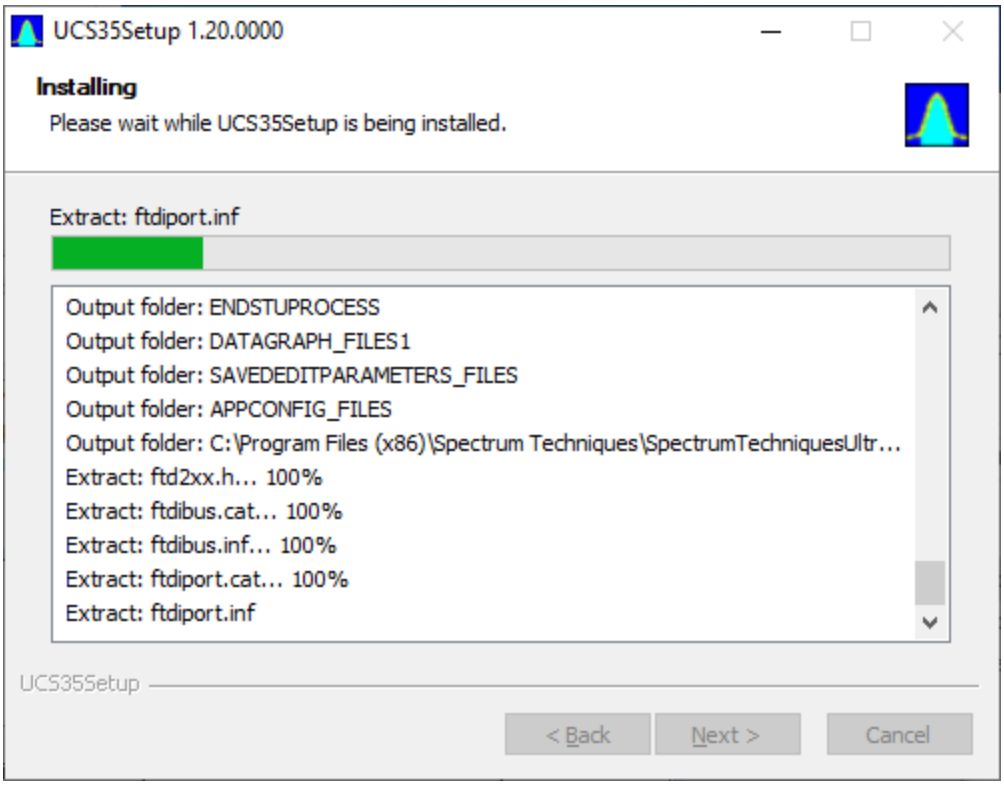
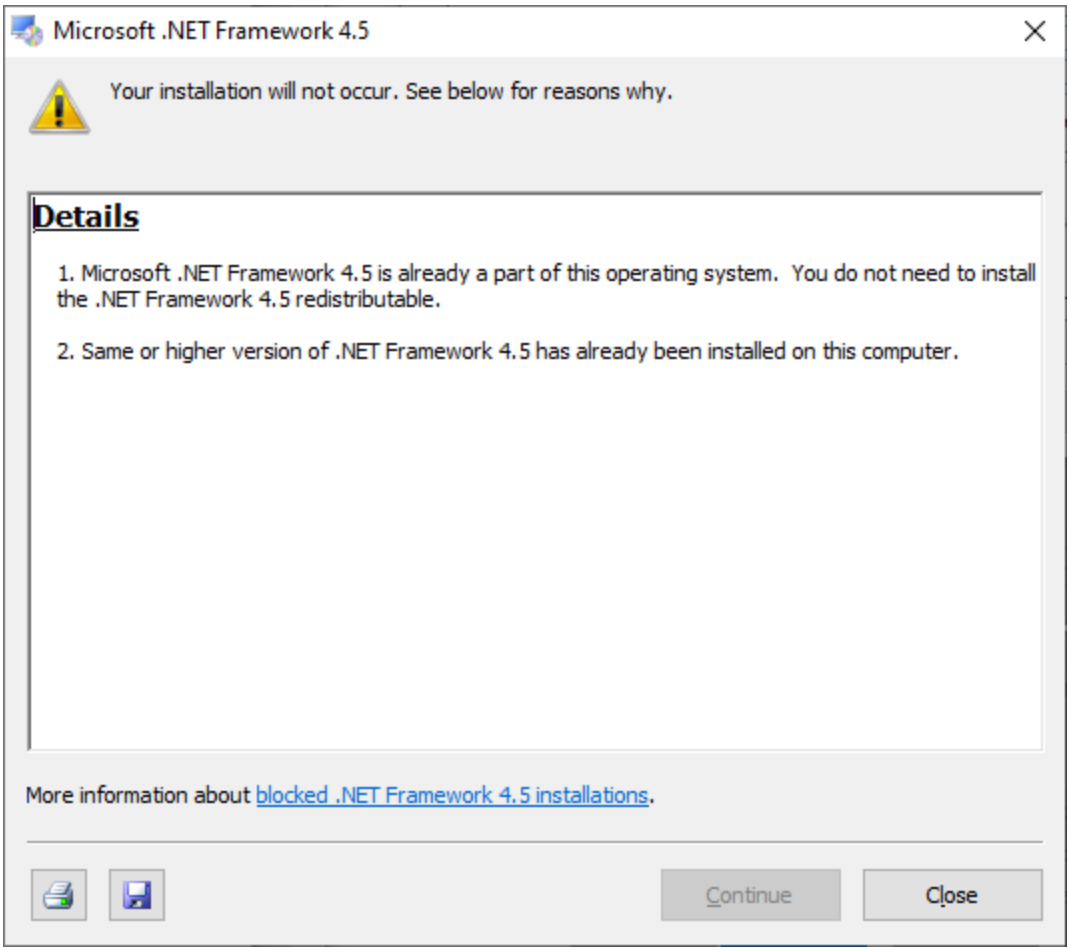


Figure 5

If the Microsoft .NET Framework 4.5 is already installed on your computer, then you will see the following message appear on your screen. This message informs you that there is no need to install the Framework 4.5 because it is already installed. Click **Close**.



A new window appears that looks like Figure 6:

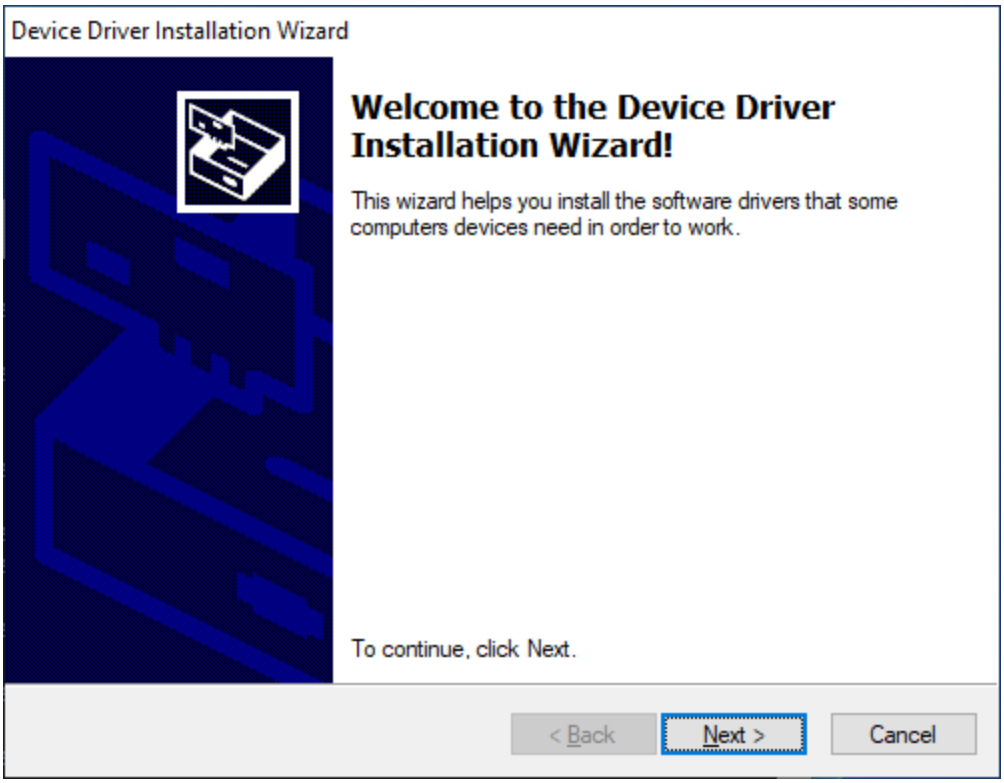


Figure 6

Click **Next**. After a moment the window changes to look like Figure 7:

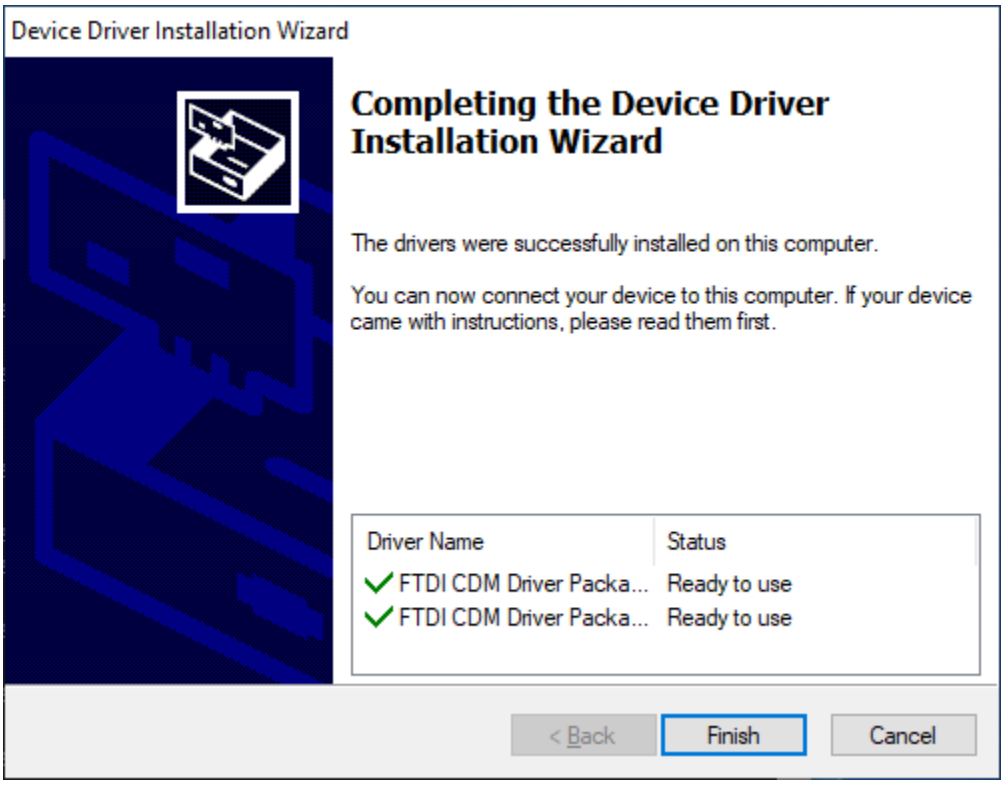


Figure 7

Click **Finish**. The window changes to look like Figure 8:

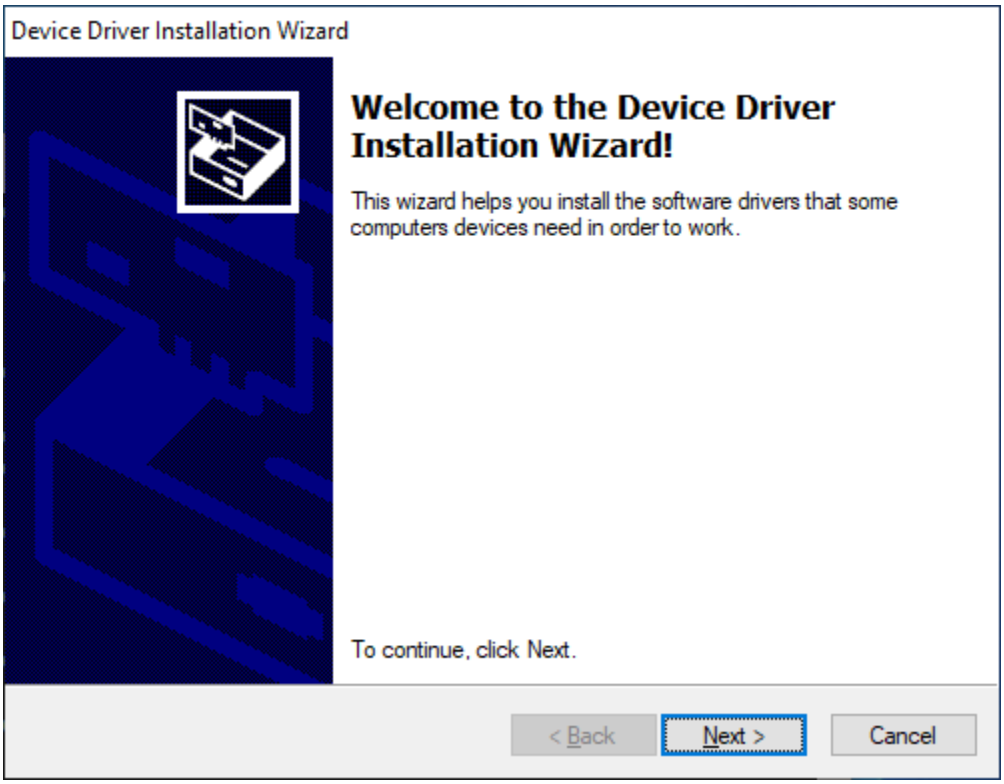


Figure 8

A new window appears that looks like Figure 9:

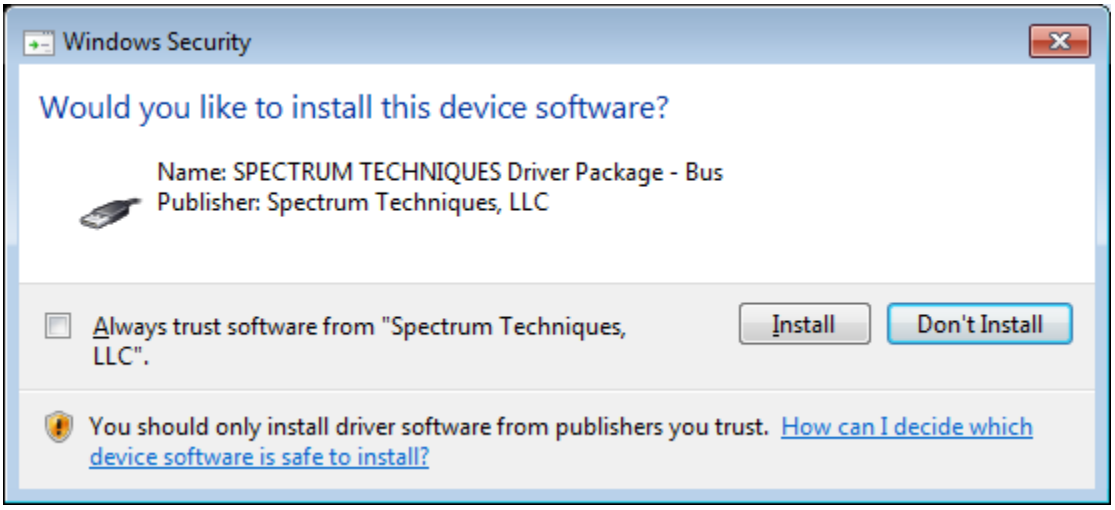


Figure 9

Click **Install**. After a moment this window disappears and you see a window that looks like Figure 10:

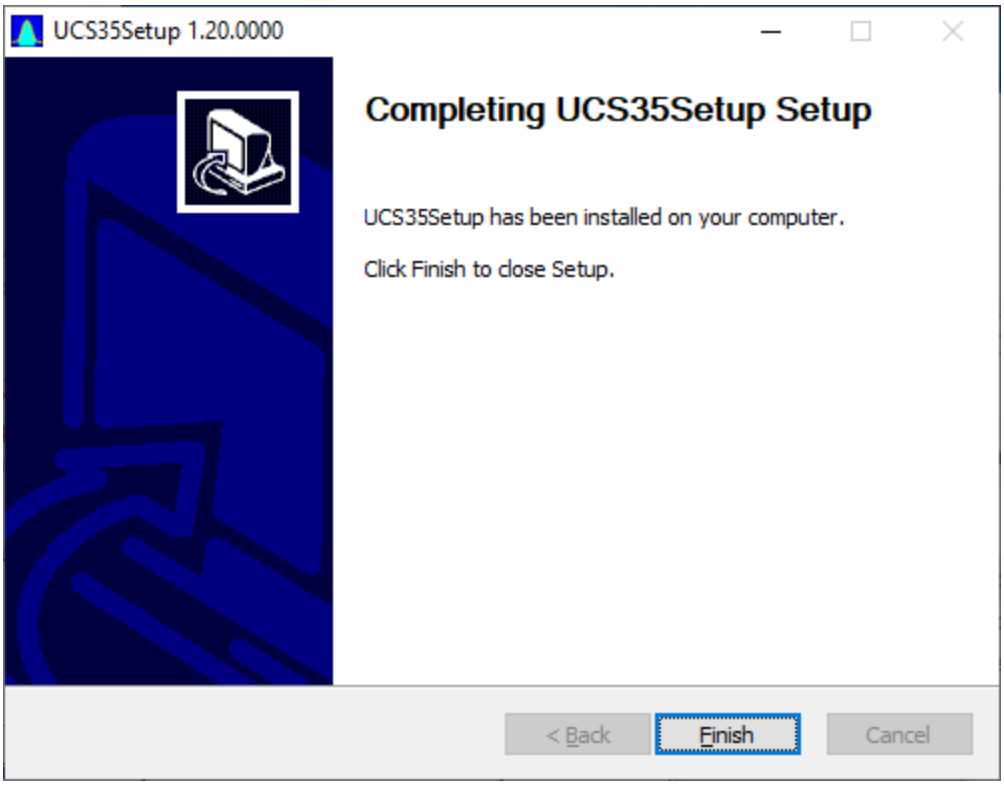


Figure 10

Click **Finish**. At this point UCS35 and accompanying device driver should be properly installed on your computer. On your Desktop you should see that a new shortcut icon has been added. The shortcut is named *UCS35*. On your computer Desktop find a new shortcut icon that looks like this:

If your computer has an antivirus software application running your computer might display a message informing you that it detected a possible virus while installing the UCS35 software. The antivirus application might quarantine the installed UCS35 software and prevent it from running on your computer. If this happens it will be necessary for you to configure the antivirus application so it will exclude the UCS35 software from quarantine.

For example, the Avira antivirus software application mistakenly detects the UCS35 software as containing a virus and quarantines the installation folder for it. To correct this it is necessary for you to open Avira and open the Performance Tab. Then click on the Advanced Tools button. This causes a new window to appear. Click the gear icon in the upper right-hand corner of this window. Doing this takes you to the Settings page within Avira. Click the Exclusions tab located at the lower left corner of this page. Next to the *Select exclusion list* text select the option *Files and Folders* from the dropdown menu. At the bottom of the page click the *Add Folders* button. Doing this causes a popup window named *Browse For Folder* to appear. From within this popup window navigate to the folder *C:\Program Files (x86)\Spectrum*

Techniques\SpectrumTechniquesUltraUCS35 and click OK. Close out of all of the Avira windows that are on your computer screen. After this run the UCS35Setup.exe file again. This time it should successfully complete the installation without Avira quarantining the UCS35 software application.

You may use the *UCS35* shortcut to launch the UCS35 desktop software application. If for any reason the software application quits responding to user input, you can use a shortcut named *STUEndProcess* to terminate the application. *STUEndProcess* is accessible from the Start Menu by navigating to *All Programs > Spectrum Techniques > STUEndProcess*. STUEndProcess is intended for use to force a non-responsive session of the *SpectrumTechniquesUltra* application to close. This is useful in the event that it gets stuck and refuses to respond to user commands. After you have resolved the communication problem use the *UCS35* icon to relaunch the UCS35 software application and reconnect.

Uninstall Software

If you find it necessary to uninstall the UCS35 application software on your computer, do this:

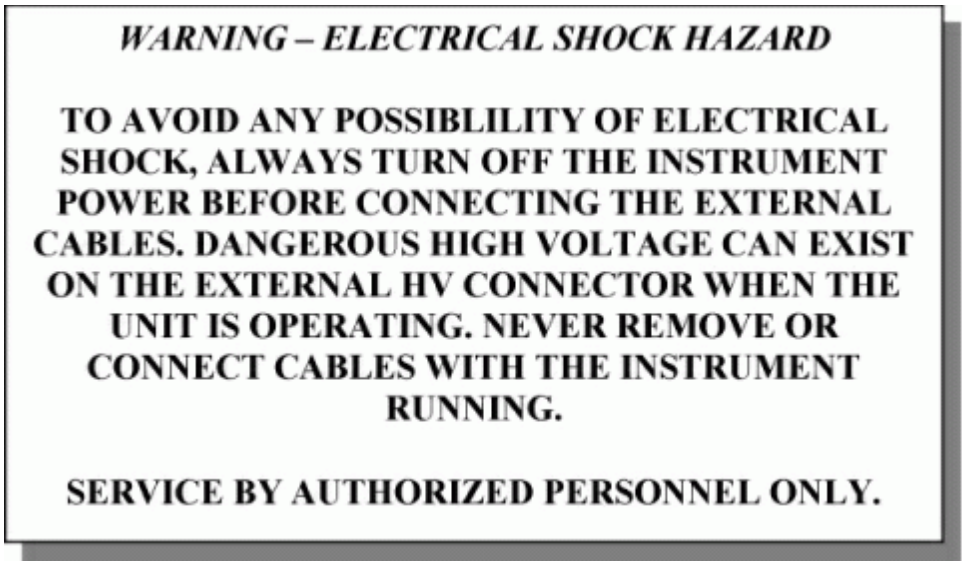
1. On your computer desktop locate a new icon labeled **Uninstall UCS35**
2. Double-click this icon. Doing this causes the **Uninstall.exe** program to run
3. Click the **Yes** button on the 'User Account Control' window that appears
4. Click the **Uninstall** button located at the bottom of the **UCS35Setup Uninstall** window

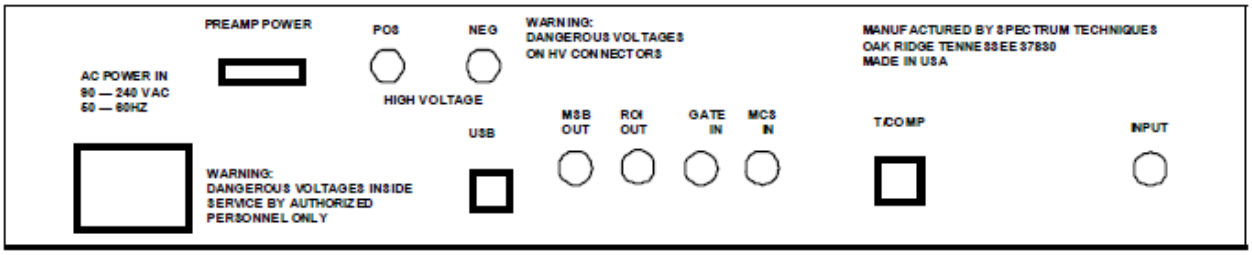
If for some reason you do not find this **Uninstall UCS35** icon on your computer desktop, there is another way to uninstall the UCS35 application software. Do this:

1. Open a session of File Explorer
2. Navigate to the folder **C:\Program Files (x86)\Spectrum Techniques\SpectrumTechniquesUltraUCS35**
3. Find the executable program file named **Uninstall.exe** within this folder
4. Run this program file
5. Click the **Yes** button on the 'User Account Control' window
6. Click the **Uninstall** button located at the bottom of the **UCS35Setup Uninstall** window

By following these steps you will successfully uninstall the UCS35 application software.

Connections On Rear Panel





Rear Panel

CAUTION: Be sure to use the correct high voltage polarity for your device to prevent possible damage to equipment.

POS HIGH VOLTAGE: MHV (or optional SHV) connector supplies positive 0 - 1200 volt @ 1mA maximum current to power scintillation detectors. High voltage is fully regulated and computer controlled in 2 volt increments.

NEG HIGH VOLTAGE: Negative High Voltage is an Option. If this option is added, the UCS30 can also supply negative 0 - 1200 volt @ 1mA maximum current to power scintillation detector through an MHV (or optional SHV) connector. High voltage is fully regulated and computer controlled in 2 volt increments.
Either the POS HIGH VOLTAGE or NEG HIGH VOLTAGE may be selected for use. Go to the “Settings” menu, then choose the “Amp/HV/ADC Settings” sub menu to gain access to the polarity selection.
WARNING: HIGH VOLTAGE must be “OFF” before switching between POS HIGH VOLTAGE or NEG HIGH VOLTAGE. Failure to comply with this WARNING may result in severe instrument damage.

INPUT: BNC connector. This input is for signals from a scintillation detector, scintillation preamplifier, or other type detector amplifiers (proportional counter, germanium detector) for

eventual processing by the ADC. The internal scintillation preamplifier and also the scintillation amplifier can be bypassed using the "Mode" menu.

MCS IN: BNC connector to input positive Multichannel Scaling (MCS) TTL pulses, > 150nsec. 5 MHz maximum rate.

GATE IN: BNC connector for connection to external coincidence unit. A positive TTL pulse causes the ADC to accept the next pulse. The Gate pulse must be present before the peak of the input Pulse. Gate pulse width = 50 nsec to 2 · sec.

MSB OUT: BNC connector to output the most significant MCS bit for Mossbauer Applications. The output pulse period in seconds is equal to the dwell time multiplied by the conversion gain. Used as a trigger for an external device (i.e. constant acceleration drive). Output will begin after the first pass in Mossbauer mode.

USB: Universal Serial Bus connector for communication with computer.

PREAMP POWER: DB-9 connector, supplies · 12v and 24v power for External preamplifier.

(24v preamplifier power output is available to ensure compatibility with germanium detectors).

Explore SpectrumTechniquesUltraUCS35 SUB-FOLDERS

This section discusses the internal folder structure used by the UCS35 application. You may skip this section if you want to immediately proceed to system setup.

Open a session of Windows Explorer. Navigate to the folder *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\AppConfig_Files*. Do not modify or delete the contents of any of the files in this folder. This folder is where the UCS35 software stores many of the text files that it uses to control how the UCS35 software application behaves during normal operation.

There is a subfolder named *Backup* located within the *AppConfig_Files* folder. This backup folder contains archived copies of the SpectrumTechniquesUltraUCS30.config file located in *AppConfig_Files*. If for some reason while using the UCS35 software application it becomes unstable or will not run, you can try replacing the SpectrumTechniquesUltraUCS30.config file located in folder *AppConfig_Files* with a recent config file from the Backup folder. Make sure the UCS35 app is not running at the time you do this. Also, be sure to rename the backup file to say *SpectrumTechniquesUltraUCS30.config* after you copy it to the *AppConfig_Files* folder. Doing this will restore the configuration to a recent one that is known to work correctly. This should fix the problem with not being able to run the UCS35 software and get it back to working again.

Navigate to the folder *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\DeviceParams_Files*. Do not modify or delete any of the files in this folder. This folder is where the UCS35 software application stores device parameters for each of the various Spectrum Techniques hardware devices that the UCS35

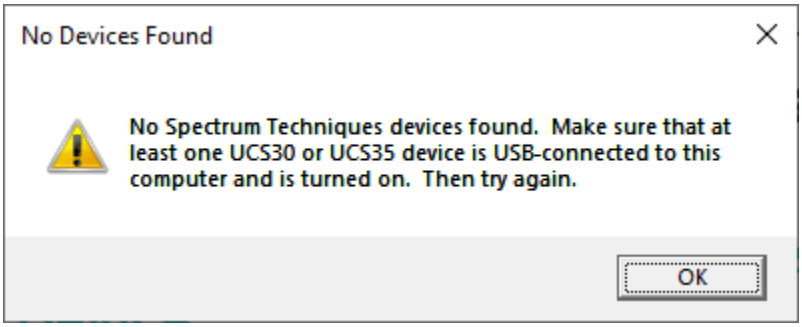
application has had connected to it. When the software was initially installed the only file contained in this folder was named *Default.stx*. This file is used as a template for the initial configuration of a new device the first time that device gets USB or LAN-connected to the computer that runs the UCS35 software application. Do not modify or delete this *Default.stx* file. After you connect the UCS35 application to a new device and subsequently disconnect from the device, a new .stx file gets automatically created and will appear in the *DeviceParams_Files* folder. This new .stx file name consists of the custom model and the serial number of the device that was connected. Normally, there is no reason to modify or delete any of the custom files located within folder *DeviceParams_Files*. Deleting a custom file from this folder will cause the UCS35 software to recreate the custom file from the *Default.stx* file the next time you connect to that particular device.

SYSTEM SETUP

Use the following instructions only after you have completed the software installation procedure described above in the INSTALL SOFTWARE section of this document. Connect your detector probe to the hardware device you plan to use. Depending on which particular device you use, you should connect it to the computer by following the procedure outlined in the appropriate Spectrum Techniques setup manual. Spectrum Techniques supplies setup manuals for models UCS35 and UCS40.

Run the UCS35 software application. One way of doing this is by double-clicking the UCS35 icon located on the computer Desktop. It looks like this:

If no Spectrum Techniques device is connected and turned on, you will see this message.



Click OK. After a brief initialization delay the main application window appears on screen. This window should look similar to Figure 11.

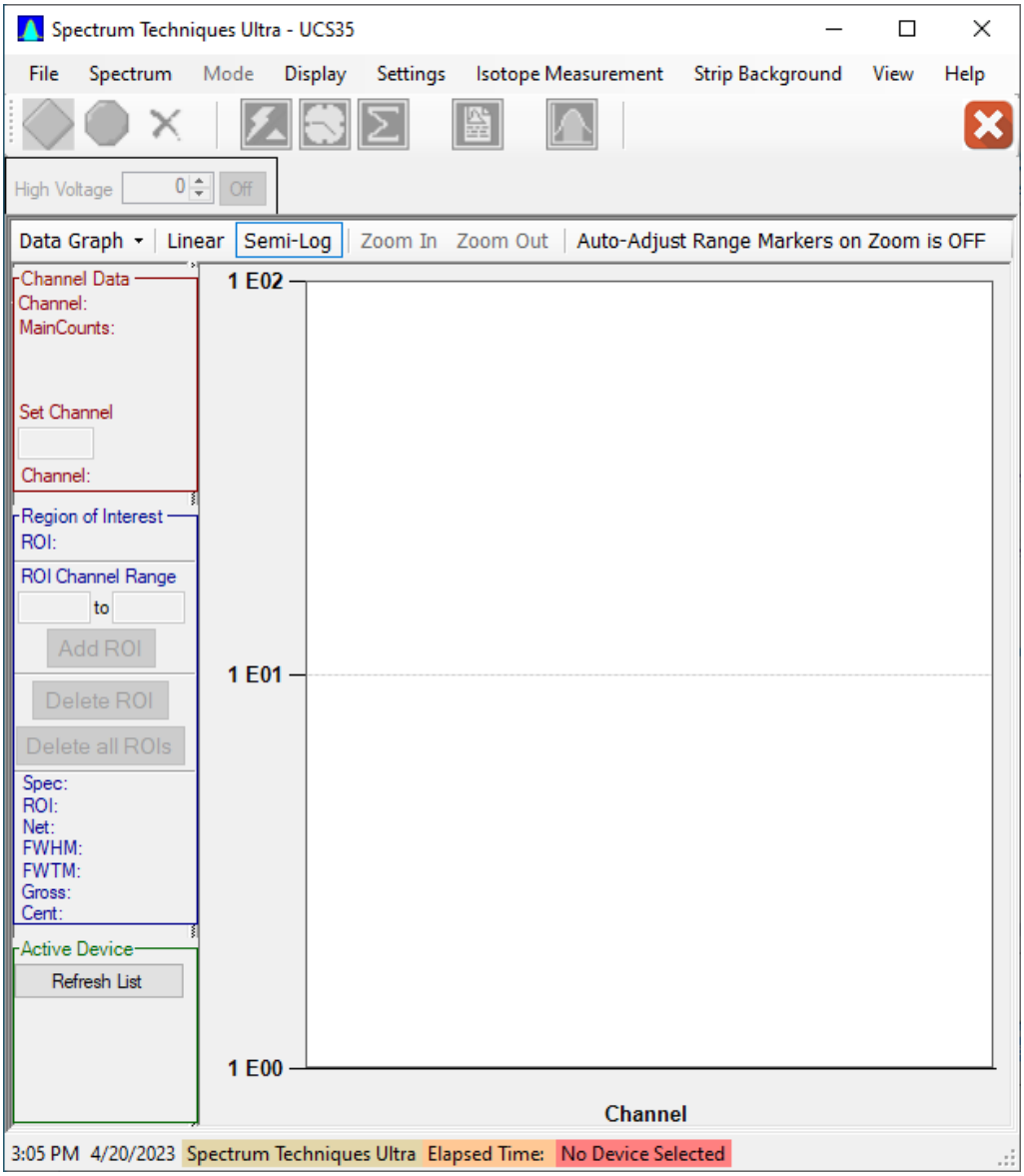


Figure 11

Note in Figure 11 that the status bar contains a red text block that shows *No Device Selected*. When you see this red text block in the status bar, it is telling you that the UCS35 software application is not presently controlling a Spectrum Techniques hardware device. At runtime the UCS35 application will attempt to determine how many Spectrum Techniques devices are turned on and are USB-connected to the computer. If there is only one device turned on and USB-connected, then the UCS35 application will automatically attempt to connect to it. If there is more than one device USB-connected or the application does not automatically connect, you should click the red *No Device Selected* text block on the status bar. Doing this allows you to manually connect to a Spectrum Techniques device.

The following discussion assumes the computer you are using to run the UCS35 application is connected to at least one UCS35 device and that the device is turned on. Clicking the red *No Device Selected* text in the status bar causes the application to pop up a *Select Spectrum Techniques Device* window as shown in Figure 12.

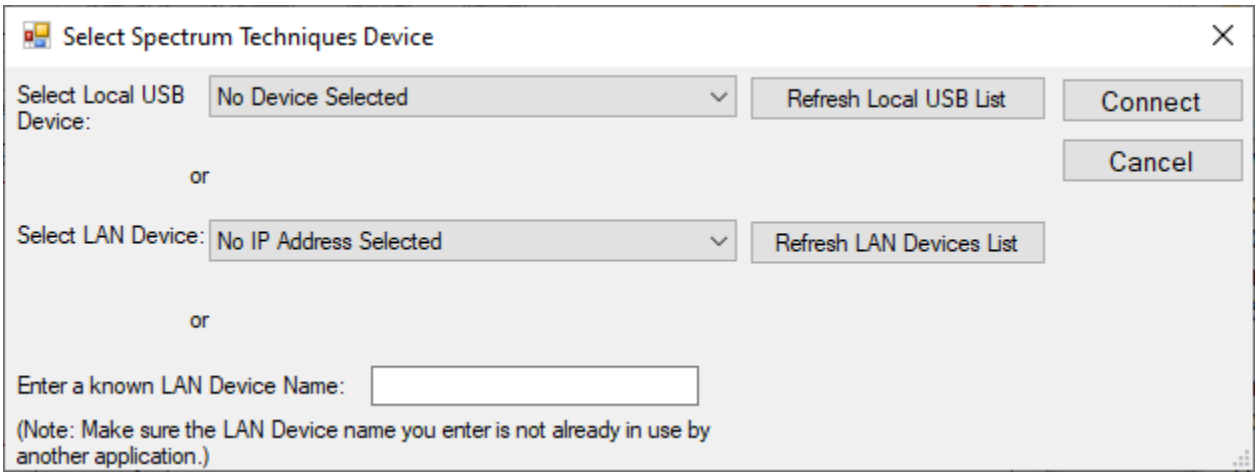


Figure 12

This window offers three different ways to connect to a device. The first way is by using the dropdown menu located next to the label *Select Local USB Device*. Note that by default this dropdown box shows *No Device Selected*. Click the down arrow to see more connection options. Each option shown is for a particular Spectrum Techniques device that is currently turned on and USB-connected to the local computer. If for some reason this dropdown box does not contain the model and serial number of a USB-connected device that you want to use, click the *Refresh Local USB List* button. This causes the contents of the dropdown box to refresh. Click the *Select Local USB Device* dropdown box again and see whether it now contains the device you want to use. If it does, then select the device and click Connect. If the dropdown box does not contain the device, then try turning the USB-connected device off, wait a few seconds, and turn the device back on. Then click the *Refresh Local USB List* button again and see whether the device name now appears and is selectable within the Select Spectrum Techniques Device dropdown box. If all else fails, click the Cancel button to dismiss the window. Then click the red No Device Selected text in the status bar again to try again to connect.

With the device now turned on and USB-connected, again click the *Select Local USB Device* dropdown box. This time it should display a list of all USB-connected devices. See Figure 13. The example shown here is for the case where there is only one Spectrum Techniques device available from which to choose. The device is named *UCS35 0*. This means that the device is a Spectrum Techniques model UCS35 using serial number 0. Click the *Connect* button.

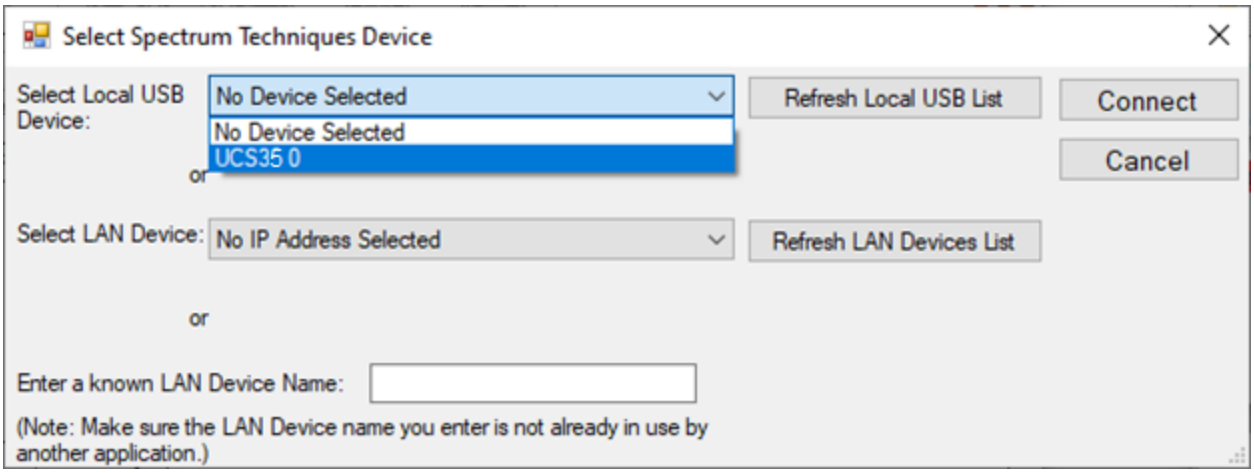


Figure 13

A second way to connect is by using the dropdown menu located next to the label *Select LAN Device IP address*. The software uses this method of connecting only if the *Select Local USB Device* menu shows *No Device Selected*. By default the *Select LAN Device IP address* dropdown box shows *No IP Address Selected*. Click the down arrow to see more connection options. Each option shown is an IP address of a particular Spectrum Techniques device that is turned on and is LAN-connected to your computer's local network. If for some reason this dropdown box does not contain the IP address of a LAN-connected device that you want to use, click the *Refresh LAN IP Address List* button. This causes the application to update its list of LAN-connected devices and to refresh the dropdown list. This process might take a few seconds to complete. Once the list has completed updating click the dropdown menu once again and select the desired IP address for the device you want to use. Click the *Connect* button.

A third way to connect is by using the text box located next to the label *Enter a known LAN Device IP Address*. The software uses this method of connection only if the *Select Local USB Device* menu shows *No Device Selected* and the *Select LAN Device IP address* menu shows *No IP Address Selected*. This text box is useful in the case where you already know the IP address of the LAN-connected Spectrum Techniques device you want to use. Simply type the IP address into the box and click the *Connect* button.

When you click the *Connect* button the *Select Spectrum Techniques Device* window disappears and, after a moment, the UCS35 main window updates to look something like Figure 14.

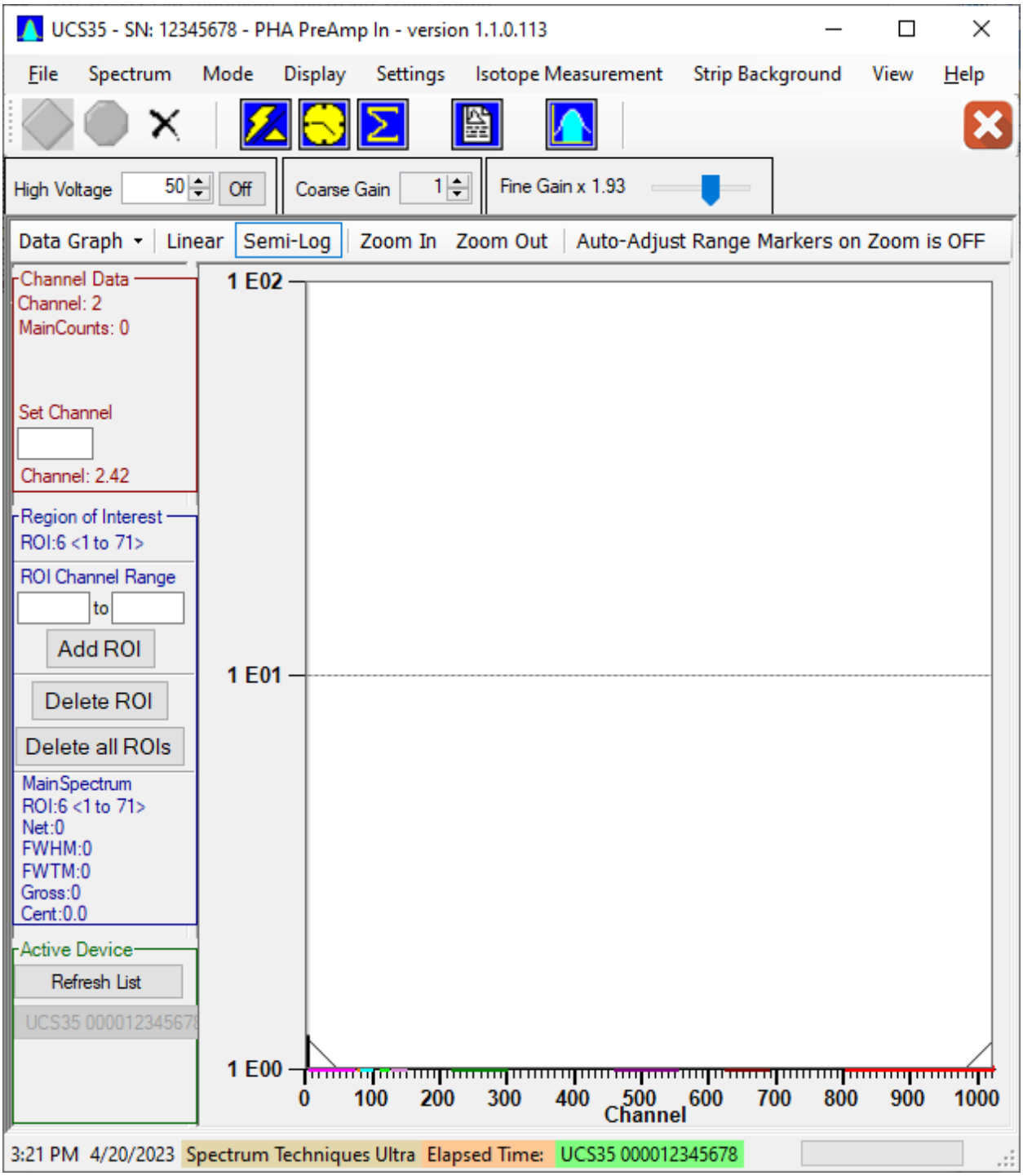


Figure 14

Note that the status bar now has a green text block that shows something like UCS35 000012345678. When you see this green text block in the status bar, it tells you that the UCS35 software application is currently in control of a Spectrum Techniques device and what its connection information is. Note that the information displayed here pertains to USB-controlled

devices. When the UCS35 software application is in control of a LAN-controlled device the green text block will display something similar to this:

UCS35 0, 10.1.10.128, 70-B3-D5-95-30-02

The text displayed here tells you the model number, serial number, IP address, and MAC address of the Spectrum Techniques device currently under control of the UCS35 software application. The MAC address shown corresponds to the MAC address included on a label affixed to the underneath side of each Spectrum Techniques device. This MAC address is unique for all devices manufactured by Spectrum Techniques. By comparing the MAC address displayed on-screen with the MAC addresses of your Spectrum Techniques devices you can determine which physical device the UCS35 software application is currently controlling.

The gray text block to the right of this green block shows the firmware version information for the software component used by the command processor within the device. This software component version notation is *MajorRevision#.MinorRevision#.Build#*. If you do not see this gray text block try enlarging the width of the main application window until the gray text block appears. If you encounter problems operating your UCS35 device and contact Spectrum Techniques for technical support, the technician assigned to help you might ask you to provide them with this information. At this point your UCS35 software is connected to a device and is ready to use.

USING YOUR SYSTEM

The UCS35 main window is comprised of several sub-windows. See Figure 15 below for the names of each of these sub-windows.

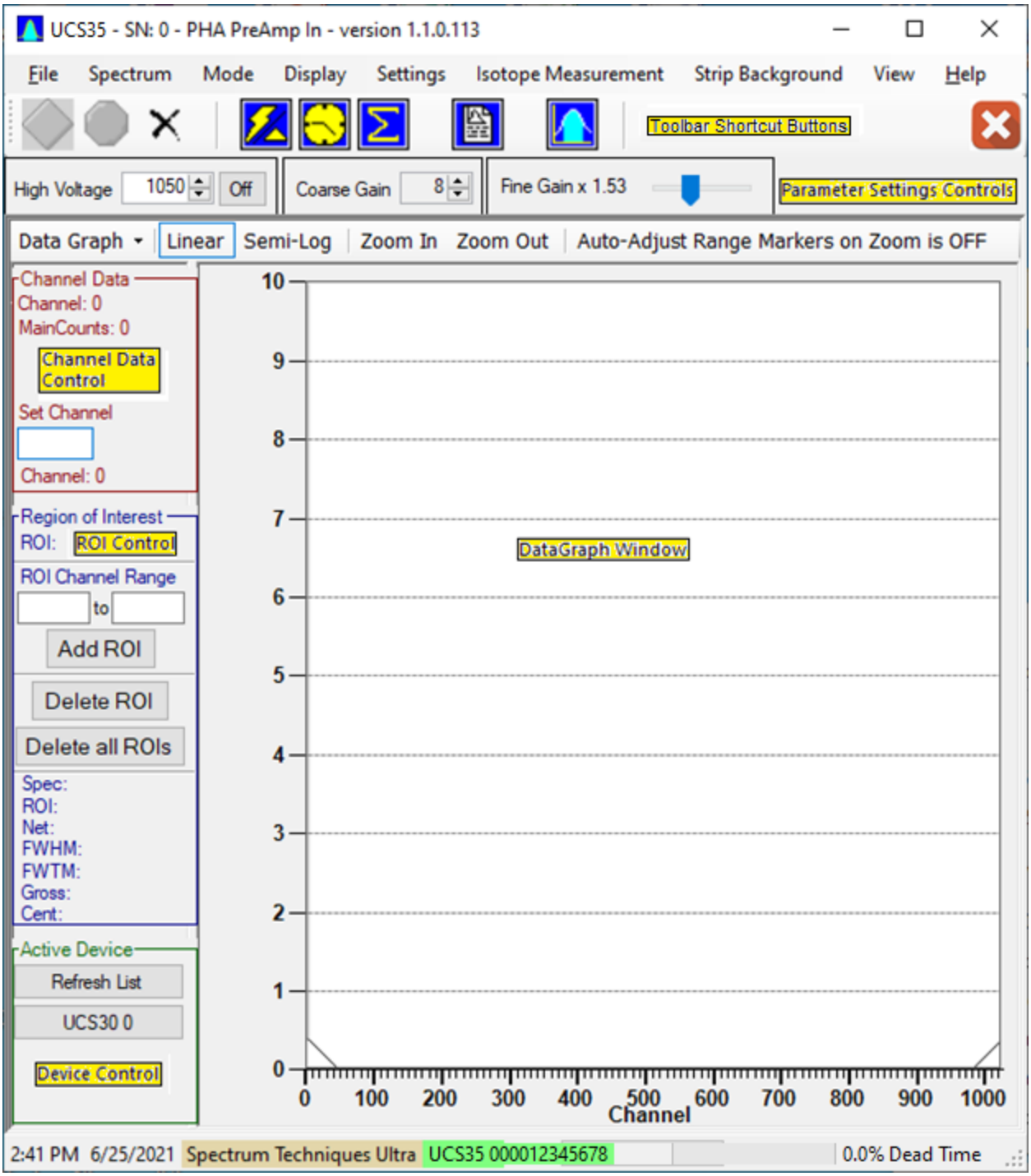


Figure 15

Toolbar Shortcut Buttons

The toolbar located near the top of the main UCS35 application window contains shortcut buttons useful for accessing various application tools. Here is a brief description of what each of these buttons is used for.

 The **Start Counts** button is used to begin running an experiment using a given set of six run parameters. The six parameters used are High Voltage, Coarse Gain, Fine Gain, Lower-Level Discriminator, Upper-Level Discriminator, and Preset Time. These parameters are accessible via controls located within the application Toolbar and should be assigned by the user prior to clicking the Start Counts button.

When an experiment starts, the status bar will display an item for the **Elapsed Time**. The *Elapsed Time* item shows how much time has elapsed since the current experiment started. For example, if you see *Elapsed Time: 01:23:45* on the status bar, this means that the experiment has been running for 1 hour, 23 minutes, and 45 seconds. Note that this item will remain visible on the status bar even after the experiment has finished.

 The **Stop Counts** button is used to terminate a currently running experiment. When the user clicks the Stop Counts button the current experiment aborts and the UCS35 application enters a state where it is ready to start another experiment.

 The **Erase Main Spectrum** button is used to erase the spectrum displayed in the DataGraph window. When the user clicks the Erase Main Spectrum button the Y-axis adjusts to indicate that there is no longer any graph data to display.

 The **ADC Settings** button is used to display the *High Voltage, Amperage, ADC Settings* dialog. This dialog offers a convenient location where the user can view several settings at once and make adjustments to them. The user can control

- High Voltage
- Voltage Polarity
- Amp In Polarity
- Coarse Gain
- Fine Gain
- Conversion Gain
- Discriminator Channel Units
- Peak Time

 The **Preset Time** button is used to display the *Preset Time* dialog. This dialog allows the user to select between Live Time and Real Time for an experiment. Additionally, it allows the user to specify the number of seconds that the experiment will last.

 The **Preset Integral Counts** button is used to display the *Preset Integral Counts* dialog. This dialog allows the user to select a number of counts that a particular region-of-interest (ROI) must reach before the device will automatically stop counting.

 The **Peak Report** button is used to display the *Peak Report Print* dialog. This dialog allows the user to preview the report, select a printer to use, and send the report to that printer.

 The **Region of Interest** (ROI) button is used to display the *ROI Setup* dialog. This dialog allows the user to assign ROIs for the current device. Each ROI covers a lower and upper channel range and has its own particular color. ROIs are shown as color-coded regions within the DataGraph window.

 The **Shutdown Application** button is used to shut down the UCS35 software application. The application pops up a window asking you to confirm that you want to shut down. If an experiment is running at time of shut down, the experiment aborts and all UCS35 windows close. Note that when the application shuts down, it automatically saves the current location and size of the main application. It also saves all current parameters settings of the device that were in effect at the time the application shut down.

Parameter Settings Control

Directly below the **Toolbar Shortcut Buttons** is the **Parameter Settings Control** toolbar. When the device is set to one of the three pulse height analysis (PHA) modes the controls shown are:

- High Voltage
- High Voltage On/Off
- Coarse Gain
- Fine Gain
- Preset Live Time
- Preset Real Time
- Elapsed Live Time
- Elapsed Real Time

When the device is set to one of the two Multi-Channel Scaling (MCS) modes the controls shown are:

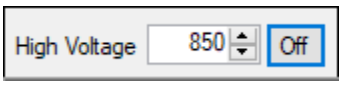
- High Voltage
- High Voltage On/Off
- Dwell Time

- Start Time

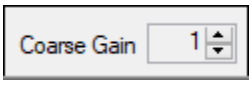
When the device is set to one of the two Mossbauer modes the controls shown are:

- High Voltage
- High Voltage On/Off
- Dwell Time
- Preset Passes
- Elapsed Passes

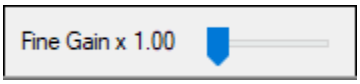
Depending on which mode the device is currently in (PHA, MCS, Mossbauer) the user begins an experiment by configuring the mode-specific parameters and clicking the *Start Counts* button.



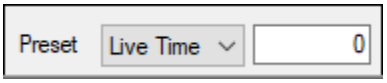
The **High Voltage** control is used to specify the desired voltage and to turn the voltage ON or OFF. High Voltage may be entered directly in the text box or may be scrolled to the value desired. A warning will be issued if you attempt to input a value higher than 1200 volts, since this is the highest value that many probes can tolerate without damage.



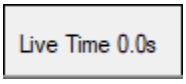
The **Coarse Gain** control is used to assign the desired coarse gain to use during an experiment. Allowable values are: 1, 2, 4, 8, 16, 32, and 64. Note that the coarse gain control applies only to the *PHA – PreAmp In* and the *PHA – Amp In* modes of operation.



The **Fine Gain** control is used to assign the desired fine gain to use during an experiment. Allowable values range from 1.00 to 2.50. Note that the coarse gain control applies only to the *PHA – PreAmp In* and the *PHA – Amp In* modes of operation.



The **Preset Time** control is used to assign preset values to either the Live time or the Real time settings. Elapsed live time provides automatic correction for counting losses caused by system deadtime. System deadtime is the amount of time required by the system to process detector pulses. Any event which occurs during a pulse processing cycle is not counted by the system. To compensate for such losses the timer is automatically updated. When operating at excessively high count-rates the deadtime meter will indicate a high value and the real counting time may be more than doubled. Preset real time sets the counting timer to run for actual clocktime; it makes no attempt to correct for losses due to deadtime effects. Make the changes you want within the Preset Time control for either live time or real time.



The **Elapsed Live Time** control displays the elapsed live time that has transpired during an experiment.

The **Elapsed Real Time** control displays the elapsed real time that has transpired during an experiment. Elapsed real time is the actual clocktime; it makes no attempt to correct for losses due to deadtime effects

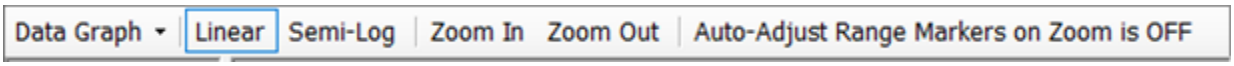
Windows Contained within the Main Application Window

The main UCS35 application contains five sub-windows. These sub-windows are:

- DataGraph Toolbar
- Channel Data Control Window
- ROI Control Window
- Device Control Window
- DataGraph Window

DataGraph Toolbar

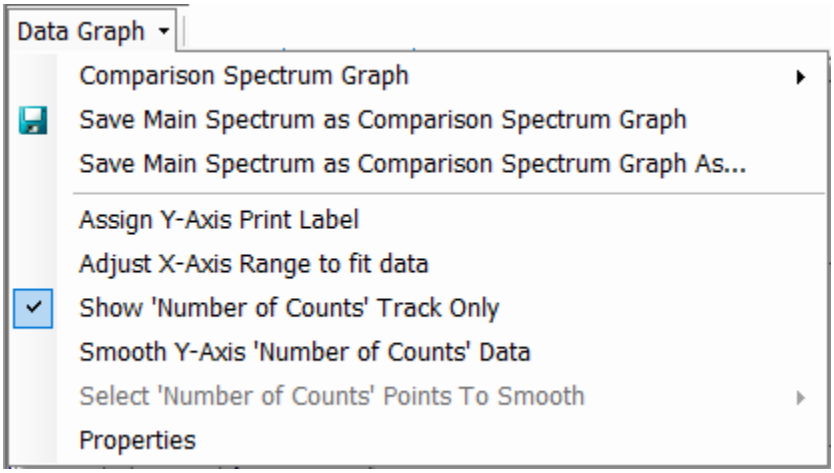
Located at the top of the DataGraph window is the DataGraph Toolbar. See below:



This toolbar contains a range of controls that allow the user to customize how information gets displayed within the DataGraph window.

DataGraph Control

The DataGraph Control dropdown menu contains menu items that are useful for controlling the behavior of the DataGraph window. See below:



Use the *Comparison Spectrum Graph* menu item to overlay a previously saved data graph from a file. This overlaid data graph will remain visible within the DataGraph window until the user removes it via the *Remove Comparison Spectrum Graph* menu.

Use the *Save Main Spectrum as Comparison Spectrum Graph* menu item to create a disk file that contains the comparison spectrum data in the DataGraph window. The system uses the file name extension **.grph** and automatically assigns a name for the file without asking the user to supply a name for it.

Use the *Save Main Spectrum as Comparison Spectrum Graph As…* menu item to create a disk file that contains the comparison spectrum data in the DataGraph window. The system uses the file name extension **.grph** and asks the user to supply a name for the file prior to saving it.

Use the *Assign Y-Axis Print Label* menu item to specify the label that gets printed along the y-axis when the user prints the contents of the DataGraph window.

Use the *Adjust X-Axis Range to fit data* menu item to adjust the range of the x-axis within the DataGraph window so it fits around the collected spectrum data. Note that this is a toggle menu item and that the adjustment will remain in effect until the user toggles the menu item OFF again.

Use the Smooth Y-Axis 'Number of Counts' Data menu item to smooth the data displayed within the DataGraph window. Note that this is a toggle menu item and that data smoothing will remain in effect until the user toggles the menu item OFF again. Also, as long as this menu item is toggled ON the DataGraph window will display the current smoothing setting at the upper right hand corner of the DataGraph window.

Use the *Select 'Number of Counts' Points to Smooth* menu item to specify how many points to use when the DataGraph window smooths the displayed spectrum data. The system allows for smoothing to be performed from every 3 points up to every 200 points. Note that this menu item is only available for use in the case where the user has previously toggled ON the *Smooth Y-Axis 'Number of Counts' Data* menu item.

Use the *Properties* menu item to display the Graph Properties dialog box. From within this dialog box the user may adjust the maximum and minimum y-axis range limits for both linear and semi-log graphs.

Linear and Semi-Log Controls

The **Linear** and **Semi-Log** control buttons work together as a command set. Only one of these two control buttons will be selected at a time. Click the Linear control button to cause the Y-Axis within the DataGraph window to toggle to show in linear scale. Click the Semi-Log control button to cause the Y-Axis to toggle to show in logarithmic scale.

You may use the mouse-wheel to adjust the vertical scale in the DataGraph window. If your mouse does not have a mouse-wheel, then hold down the CTRL-key and press the down or up arrow buttons on the computer keyboard to adjust the vertical scale in the DataGraph window.

Zoom In and Zoom Out Controls

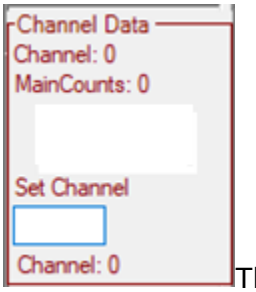
The **Zoom In** and **Zoom Out** control buttons are used to adjust the X-Axis scale. Click the **Zoom In** button to magnify the scale around the selected cursor location within the DataGraph window. Click the **Zoom Out** button to reduce the scale around the select cursor location within the DataGraph window.

Alternatively, you may use the keyboard to **Zoom In** and **Zoom Out**. To **Zoom In** via the keyboard press the **Down Arrow** key while holding down the **Shift** key. To **Zoom Out** via the keyboard press the **Up Arrow** key while holding down the **Shift** key.

Auto-Adjust Range Markers on Zoom

The **Auto-Adjust Range Markers on Zoom** control button is used to toggle automatic adjustment of range markers whenever the user performs a Zoom In or Out within the DataGraph window.

Channel Data Control Window

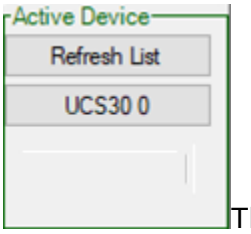


The **Channel Data Control Window** displays information about the currently selected channel. This includes channel number and main counts. The user selects a channel either by using the mouse or by using a text box located within the window. When using the text box the user types in a particular channel value and presses enter. This causes the information to update showing the new channel number and main counts.

ROI Control Window

The **ROI Control Window** displays region-of-interest information. The user may add a new ROI, delete an ROI, or delete all ROIs. Additionally, when there is spectrum data displayed within the DataGraph window, the ROI Control Window shows information about the ROI number, net counts, FWHM, FWTM, gross counts, and centroid. FWHM stands for full width at half maximum. FWTM stands for full width at one tenth of maximum.

Device Control Window



The **Device Control Window** shows which devices are currently available for connection to the UCS35 software application. The available devices are indicated by named buttons shown within the window. The user activates a device by clicking on the appropriate device name button. After a moment the selected device becomes active within the UCS35 application.

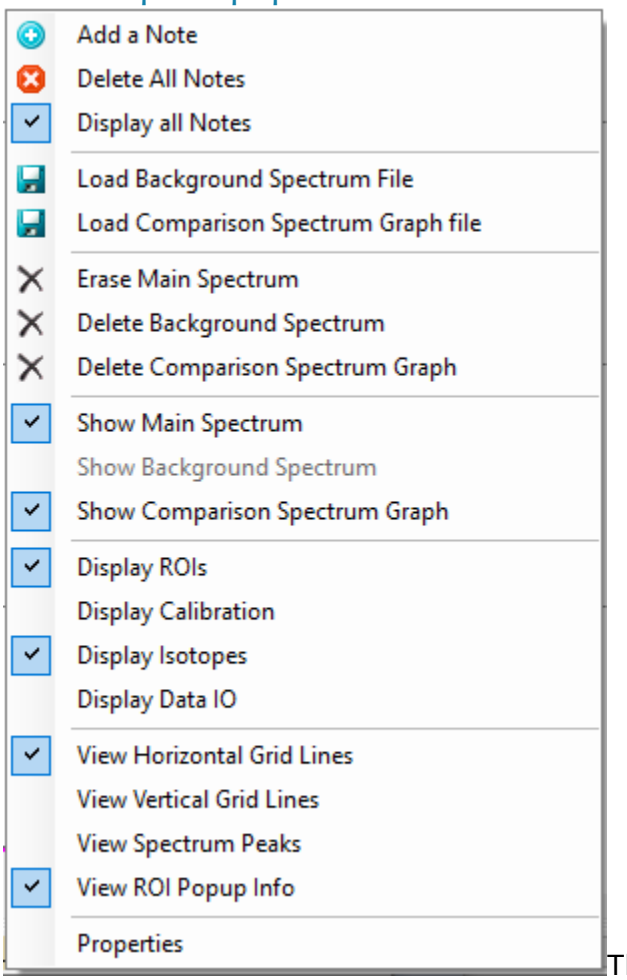
Data Graph Window

The **Data Graph Window** displays a PHA, MCS, or Mossbauer graph. While in PHA-mode the Data Graph window displays a spectrum that was acquired from an isotope sample located inside a connected scintillator probe. This probe must be physically connected to the device. The user may adjust the lower-level discriminator (LLD) and the upper-level discriminator (ULD) to select the energy range of interest (for example, positioning the LLD and ULD closely around the 662 keV peak from a CS-137 sample will eliminate unwanted background and produce a superior decay curve when using a Cs-137/Ba-137 mini-generator).

While in MCS-mode the Data Graph window displays time-related phenomena such as half-life decay or single photon counting. The device bypasses the analog-to-digital converter (ADC) and incoming counting events are routed directly into memory for specific predetermined times (dwell time). These counting events are stored in sequential memory locations. To use this mode, first acquire a spectrum using the Pulse Height Analysis mode. While acquiring the spectrum, adjust the LLD and the ULD to select the energy range of interest (for example, selecting only the 662 keV peak from CS-137 will eliminate unwanted background and produce a superior decay curve when using a Cs-137/Ba-137 mini-generator).

While in Mossbauer-mode the Data Graph window displays time-related phenomena similar to how MCS-mode works. The difference is that while in Mossbauer-mode the device uses the most significant MCS bit. The output pulse period in seconds is equal to the dwell time multiplied by the conversion gain.

Data Graph Popup Menu



The **Data Graph Popup Menu** is used to access commonly used menu commands within the DataGraph window.

Use the *Add a Note* menu item to add a new text note to the DataGraph window. The user may position the new text note anywhere within the DataGraph window and assign the desired text to the note. To delete a text note RMB-click on the anchor point of the note. Doing this causes a popup menu to appear within the DataGraph window. Select Delete Note from within this popup menu to delete the note.

Use the *Delete All Notes* menu item to delete all of the notes displayed within the DataGraph windows. The system will ask you to confirm that you want to delete all notes before performing the deletion.

Use the *Display all Notes* menu item to toggle ON or OFF the display of all notes within the DataGraph window. Toggle this menu item ON to allow notes to be displayed within the DataGraph window. Toggle this menu item OFF to hide the display of all notes within the DataGraph window.

Use the *Load Background Spectrum File* menu item to load a previously saved background spectrum file. The file name has either the extension **.spu** or the extension **.spuASCII**.

Use the *Load Comparison Spectrum Graph File* menu item to load a previously saved comparison spectrum graph file. The file name has the extension **.grph**.

Use the *Erase Main Spectrum* menu item to delete the main spectrum from the DataGraph window.

Use the *Delete Background Spectrum* menu item to delete the previously loaded background spectrum from the DataGraph window.

Use the *Delete Comparison Spectrum Graph* menu item to delete the previously loaded comparison spectrum graph from the DataGraph window.

Use the *Show Main Spectrum* menu item to toggle the display of the main spectrum within the DataGraph window.

Use the *Show Background Spectrum* menu item to toggle the display of the background spectrum within the DataGraph window.

Use the *Show Comparison Spectrum Graph* menu item to toggle the display of the comparison spectrum graph within the DataGraph window.

Use the *Display ROIs* menu item to toggle the display of all regions of interest (ROIs) within the DataGraph window.

Use the *Display Calibration* menu item to toggle the display between channel and calibrated x-axis units within the DataGraph window.

Use the *Display Isotopes* menu item to toggle the display of isotope peaks within the DataGraph window.

Use the *Display Data IO* menu item to display the data IO dialog box for the DataGraph window.

Use the *View Horizontal Grid Lines* menu item to toggle ON or OFF the display of horizontal grid lines within the DataGraph window.

Use the *View Vertical Grid Lines* menu item to toggle ON or OFF the display of vertical grid lines within the DataGraph window.

Use the *View Spectrum Peaks* menu item to toggle ON or OFF the display of peak locations for the active spectrum data contained in the DataGraph window. As long as *Spectrum Peaks* is ON the DataGraph window will display the current *Peak Sensitivity* setting in the upper right hand corner of the main window. Note that the user can adjust the peak sensitivity on-the-fly through use of a slider bar located immediately below the *Peak Sensitivity* setting.

Use the View ROI Popup Info menu item to toggle ON or OFF the display of ROI information. Note that in order for this ROI information to display it is necessary that the *Display ROIs* option within the DataGraph popup menu already be enabled. Then whenever the mouse cursor becomes positioned within an ROI boundary, the DataGraph window will automatically display real-time information about the ROI including Net Counts, FWHM, FWTM, Gross Counts, and Centroid.

Use the *Properties* menu item to display the Graph Properties dialog box. From within this dialog box the user may adjust the maximum and minimum y-axis range limits for both linear and semi-log graphs.

Menu Bar

The UCS35 software application contains a menu bar located along the top of the main application window. Once the UCS35 application is connected to a Spectrum Techniques device the menu bar updates to look like Figure 16.

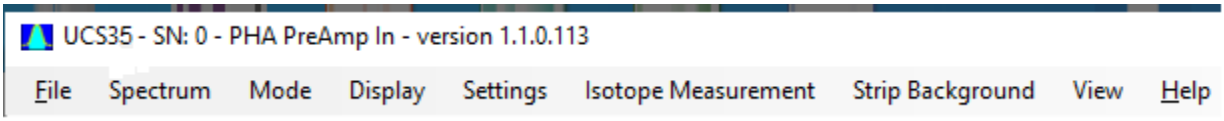
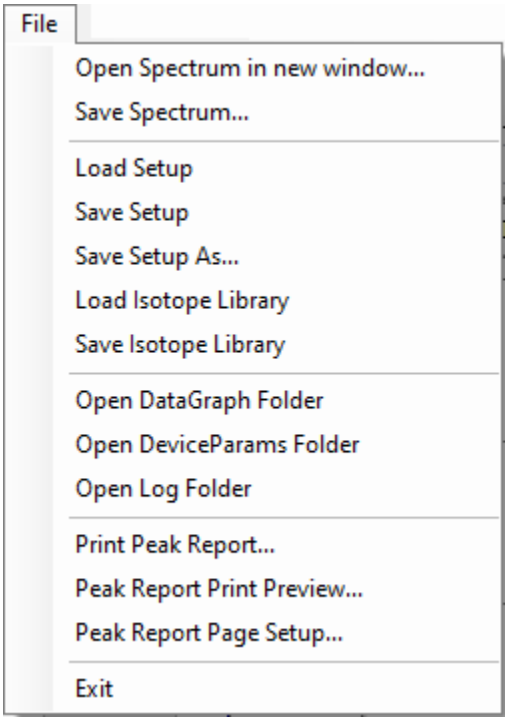


Figure 16

The menu bar contains a set of nine dropdown menus. The following discussion explains the purpose of each dropdown menu and their submenus.

File



The **File** menu allows the user to perform file IO operations. Click the *Open Spectrum in new window…* menu command to load a previously saved Spectrum file. The file has a **.spuASCII** file extension and gets loaded into a new instance of the UCS35 application with the spectrum

data displayed in its Data Graph window. The file extension differs from the **.spu** extension used previously in that it saves the information in a text-based human-readable format that lends itself to inspection in a tool like Microsoft Notepad. While the new UCS35 instance allows the user full control over the spectrum channel data, it does not allow control of a UCS35 device. Also, the ROI information displayed comes from the ROI information that was in place at the time the spectrum file was saved. User is not permitted to edit the ROI information. The spectrum file includes the conversion gain, channel data, ROI information, spectrum name, spectrum description, student ID, Detector, Comments, run start time, run end time, voltage value, voltage on/off state, coarse gain, fine gain, lower-level discriminator, upper-level discriminator, acquisition mode, preset live time, preset real time, preset integral counts, preset integral ROI, dwell time, calibration coefficients, calibration units, ROI colors, elapsed live time, elapsed real time, preset Mossbauer passes, elapsed Mossbauer passes, voltage polarity, input polarity, peak time shaping, ROI width, and ROI amplitude.

Click the *Save Spectrum…* menu command to save the current spectrum channel data to a user-defined file. Files are saved with the same **.spuASCII** file extension as described above. Along with the channel data the saved file contains the current ROI information. By default the spectrum file is saved to the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\AppConfig_Files\MCA Setup Files* folder.

Click the *Load Setup* menu command to load a setup file into the UCS35 application. Use this command to reload a previously saved setup configuration if the power has been turned off to the UCS35 device. Remember to turn High Voltage back ON after loading a setup configuration. The loaded setup file has a **.sup*** file extension and is used to replace settings that were in use by the application. The file extension includes both **.sup** and the **.supASCII** types. The **.sup** type is familiar to most users of previous versions of Spectrum Techniques UCS software applications. It is the legacy setup file type that allows the user to load older setup files into the UCS35 application. The **.supASCII** type is a new setup file extension. This new **.supASCII** type is used to save configuration information in a text-based human-readable format. After the user performs a *Load Setup* command the UCS35 application contains configuration settings obtained from the loaded setup file.

Click the *Save Setup* menu command to save the current configuration settings to a setup file. The setup file is saved with the **.supASCII** file type and is written to the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\AppConfig_Files\MCA Setup Files* folder. The setup file is automatically saved using a name based on the model number and serial number of the device connected to the UCS30 software application at the time the save operation is performed.

Click the *Save Setup As...* menu command to save the current configuration settings to a setup file. The user is required to supply a file name to use when saving the setup file. The setup file is saved with the **.supASCII** file type and by default is written to the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\AppConfig_Files\MCA Setup Files* folder.

Click the Load Isotope Library menu command to load an isotope library file into the UCS35 application. The file must be named *isotopes.itmASCII* and is located in the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\AppConfig_Files* folder.

Click the Save Isotope Library menu command to save the current isotope configuration settings to a file. The file extension is **.itmASCII**. The file is named *isotopes.itmASCII* and is saved in the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\AppConfig_Files* folder.

Click the *Open DataGraph Folder* menu command to open a new Windows Explorer window. This new window shows the files contained in the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\DataGraph_Files* folder. Files contained here have user-assigned names and have the file extension **.grph**. The information contained in each file records the contents of the datagraph window at the time the file was saved.

Click the *Open DeviceParams Folder* menu command to open a new Windows Explorer window. This new window shows the files contained in the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\ DeviceParams_Files* folder. Files contained here have the file extension **.stx**. One particular file in this folder is named Default.stx. This is a special file used by the UCS35 application. The information contained in this file determines the default configuration settings that get loaded into the UCS35 application when it connects to a device for the first time. All other .stx files in this folder are named for devices with a particular model and serial number. The contents of these files determine the configuration settings that get loaded into the UCS35 application when it connects to a device with the given model and serial number.

Click the *Open Log Folder* menu command to open a new Windows Explorer window. This new window shows the files contained in the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\ Log_Files* folder. Files contained here have the file extension **.txt**. Each file contained in this folder is named according to the date on which it was recorded. Additionally, the files are numbered according to the order in which they were saved on that date. The information contained in each file is intended for use by Spectrum Techniques personnel for forensics purposes to help debug a faulty UCS35 software action. In the event that you contact Spectrum Techniques with an unexpected problem you encountered during operation of your UCS35 system you might be requested to e-mail certain log files from this folder so our technical support staff can review them looking for clues as to what caused the fault.

The three menu commands *Open DataGraph Folder*, *Open DeviceParams Folder*, and *Open Log Folder* are always active within the UCS35 application regardless of whether the application is connected to a Spectrum Techniques device.

Click the *Print Peak Report…* menu command to open a Print dialog box. This box allows the user to select certain printer preferences and to select a printer to use when printing. The printed peak report document contains the data graph, experiment details, setup information, region-of-interest information. If your computer has the *Microsoft PDF Printer* driver installed the Select Printer section of the Print dialog box will include an item labeled *Microsoft Print to PDF*. Select this item as the printer you want to use if you want to save the document as a PDF file rather than sending the document directly to a printer. There is no default folder location for storing these PDF files. You will have to specify the desired folder to use each time you save a PDF file.

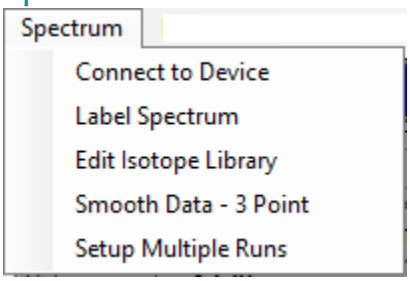
Click the *Peak Report Print Preview…* menu command to open a Print dialog box. This box differs from the *Print…* box in that it presents the user with an on-screen preview of the

document before they actually print it. In step 1 of the print preview box the user selects the printer to use. In step 2 the user reviews the print preview to decide whether or not to print the document. In this step the user either clicks the printer icon to print the document or clicks the Close button to dismiss the Print dialog box without printing.

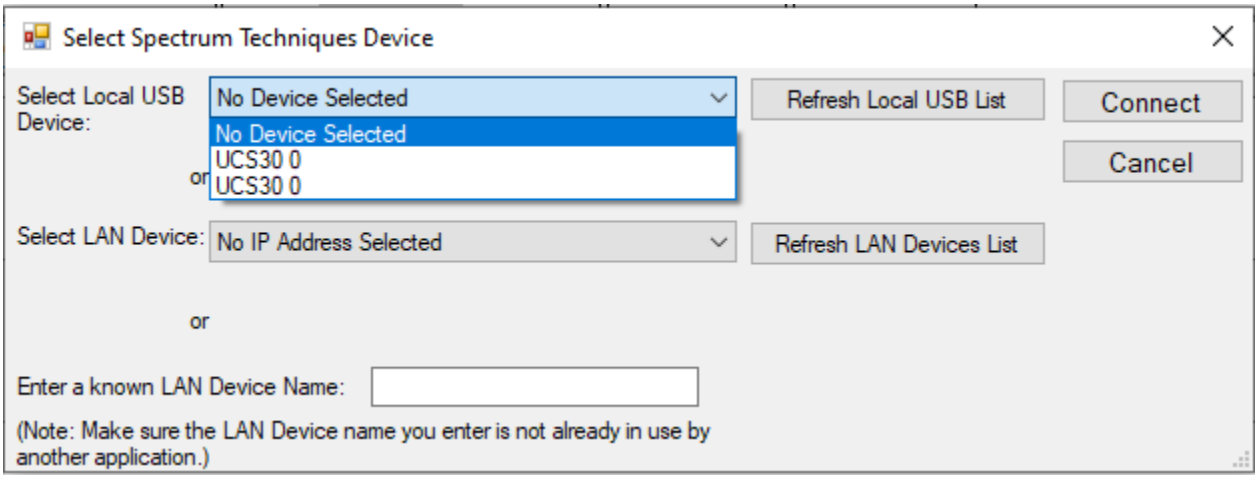
Click the *Peak Report Page Setup…* menu command to open the Page Setup dialog box. The information contained in this box allows the user to specify particular printer settings to use when printing a peak report document within the UCS35 application.

Click the *Exit* menu command to terminate the UCS35 software application. You will be asked to confirm whether you really want to shut down the software.

Spectrum



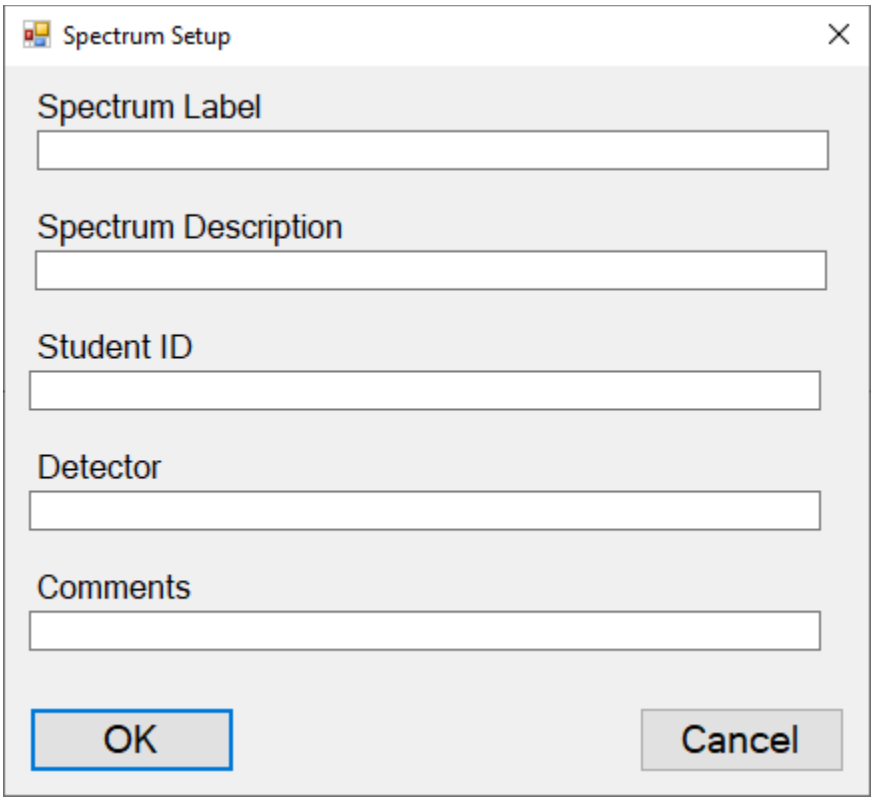
The **Spectrum** menu allows the user to perform spectrum operations. The text shown in the first menu command differs according to whether there is a device currently connected to the UCS35 application. If there is no device connected the menu command shows *Connect to Device*. Click this menu item to begin the process of connecting to a device. This displays a window that allows the user to select from a list of connected UCS35 devices.



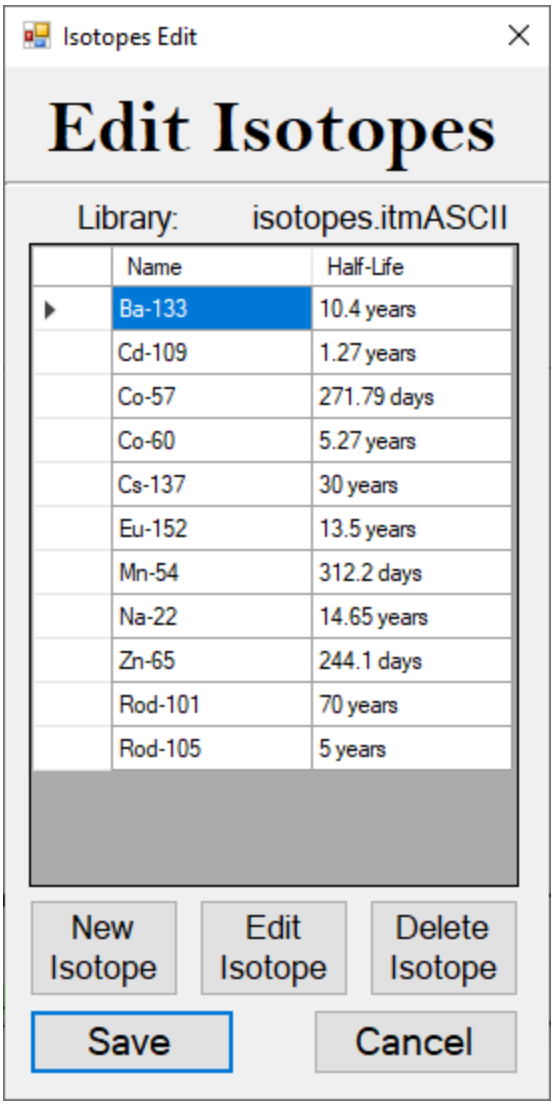
In this example there are two UCS30 devices from which to select. These devices are named *UCS30 0*. This indicates that the device is model UCS30 and the serial number is 0. For this example the user selects the first *UCS30 0* menu option and clicks Connect. Doing so enables the *UCS30 0* hardware device within the UCS35 application.

If there is already a device connected the menu command shows *Disconnect from Device*. Click this menu command to begin the process of disconnecting from the currently connected device.

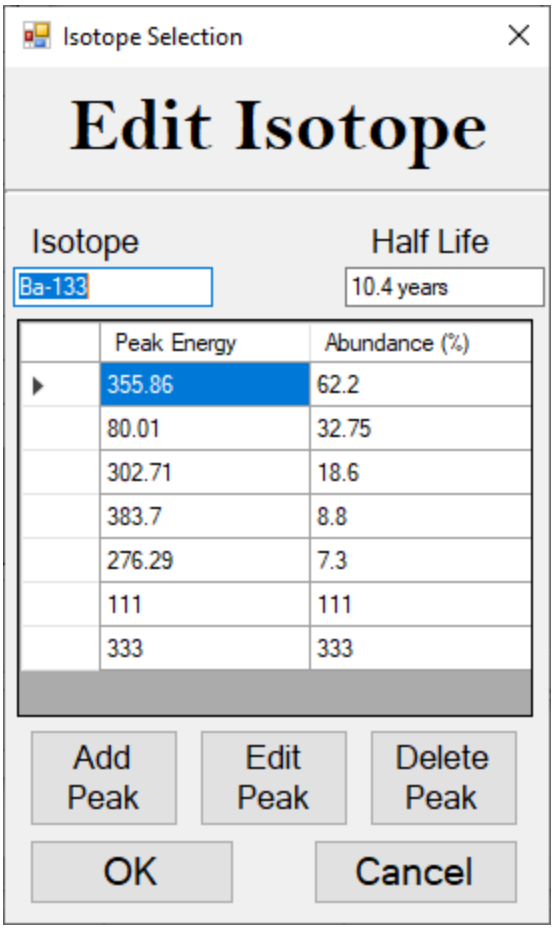
Click the *Label Spectrum* menu command to open the Spectrum Setup dialog box. This box allows the user to assign the spectrum label, spectrum description, student ID, detector name, and comments. Information assigned here appears in the printed document page when the user prints the spectrum. See below.



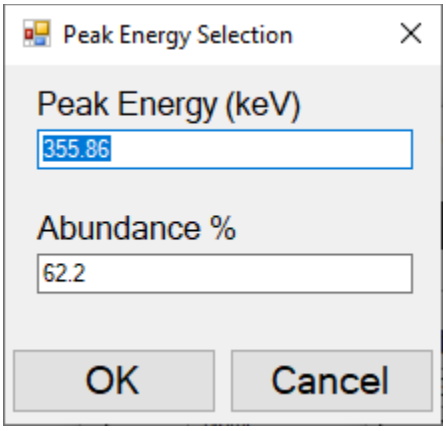
Click the *Edit Isotope Library* menu command to open the Isotope Edit dialog box. See below:



This box allows the user to create/edit/delete isotopes. Initially, the UCS35 application comes with a pre-installed set of isotopes. These isotopes are contained in a file named *isotopes.itmASCII* that is contained in the *C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS30\AppConfig_Files* folder. The information contained in this file determines which isotopes are included in the library, their chemical symbol, their half-life, and their peak locations. Click the *Edit Isotope* menu button. Doing this causes the Isotope Selection dialog box to appear. See below:



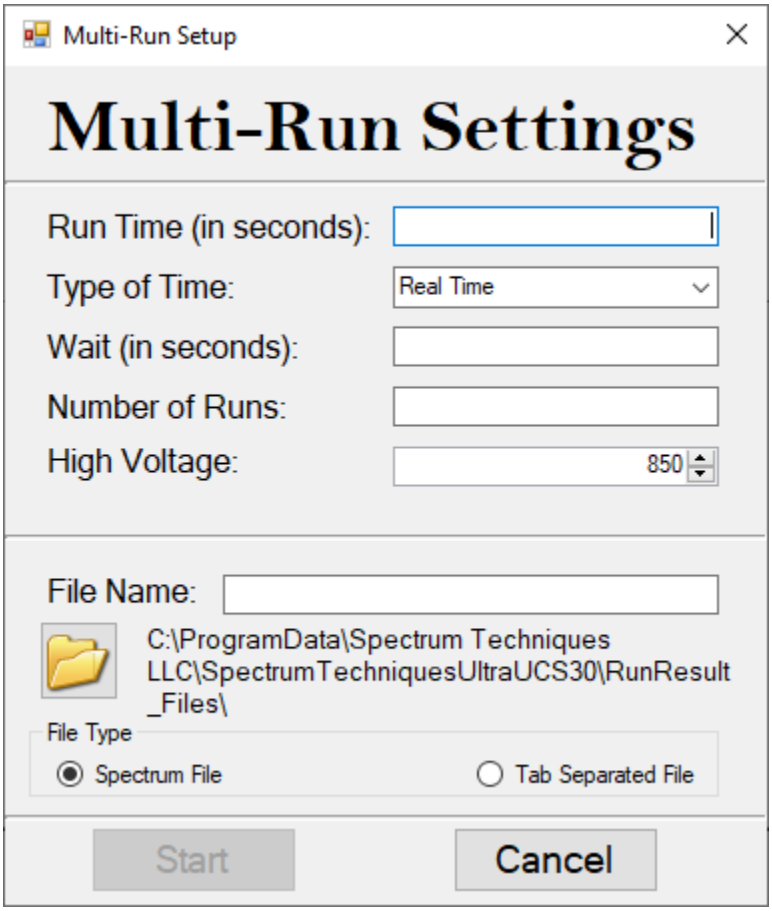
Each peak location includes a peak energy (in keV) and a relative abundance percentage. Click the *Edit Peak* menu button. Doing this causes the *Peak Energy Selection* dialog box to appear:



From here the user may assign a peak energy and abundance percentage for the given isotope. A discussion of how to display and use these isotopes is contained in the *Display* section of this user manual.

Click the *Smooth Data – 3 Point* menu command to toggle between smoothing and not smoothing the spectrum channel data displayed in the data graph. As long as smoothing is in effect this menu item displays a checkmark indicating that smoothing of the spectrum channel data is active and the top of the data graph window displays a label that says *Smooth Data – 3 Point*.

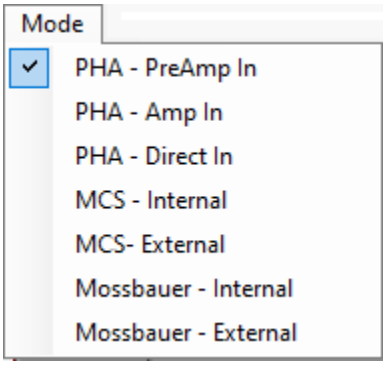
Click the *Setup Multiple Runs* menu command to open the Multi-Run Setup dialog box. This box allows the user to perform multiple runs of spectrum channel data collection in the data graph. See below:



The dialog box allows the user to assign run-time length, time type (real or live), wait time length, number of runs, and high voltage. It also allows the user to type in a file name to use for storing the output to disk. By default this file uses a *Spectrum File* format (.spuASCII) but the user may select a *Tab Separated File* format (.tsvASCII) instead. After the user assigns the required information they click the Start button at the bottom of the dialog box in order for the UCS35 application to perform the multiple runs. While the multiple runs operation is in process the UCS35 application will display a message box on screen advising the user as to the current status of the operation. This message box shows where the run files are saved to disk, run-time length, wait time length, and the current run number. The message box also has a *Cancel Multi-Run* button that the user can use should they decide they want to abort the current multiple runs operation. If the user allows the operation to proceed to conclusion this message

box disappears and *Multi-Run Finished* message displays showing where the files are saved to disk.

Mode



The **Mode** menu allows the user to select between the various UCS35 modes of operation. Click the *PHA – PreAmp In* menu command to select the mode Pulse Height Analysis (PreAmp In). This is the normal operating mode for collecting sample gamma emission spectra from the detector. It uses both the instrument's internal pre-amplifier and the amplifier. The amplitude of each detector pulse is measured by the ADC and is stored as an amplitude (energy) value. The pulse appears as a point value in the data graph window. The x-value of the point is the channel the point lies within and the y-axis is the number of counts at this channel updated to show the arrival of the new pulse.

Click the *PHA – Amp In* menu command to select the mode Pulse Height Analysis (Amp In). This mode is similar to the *PHA – PreAmp In* mode except that the incoming signal bypasses the instrument's internal pre-amplifier but still uses the internal amplifier. The amplitude of each detector pulse is measured by the ADC and is stored as an amplitude (energy) value.

Click the *PHA – Direct In* menu command to select the mode Pulse Height Analysis (Direct In). This mode is similar to the *PHA – PreAmp In* mode except that the incoming signal bypasses both the instrument's internal pre-amplifier and the internal amplifier. The amplitude of each detector pulse is measured by the ADC and is stored as an amplitude (energy) value.

Click the *MCS – Internal* menu command to select the mode Multi-Channel Scaling (Internal). This mode is used for measuring time related phenomena such as half-life decay or single photon counting. It bypasses the ADC and incoming events are routed directly into memory for a specific predetermined time (dwell time) and stored in sequential spectrum channel locations. To use this mode, the user must first acquire a spectrum using one of the three Pulse Height Analysis modes. While acquiring the spectrum, you should adjust the LLD and the ULD so as to closely bracket the energy range of interest. For example, selecting only the 662 keV peak from CS-137 will eliminate any unwanted background and will produce a superior decay curve when using a Cs-137/Ba-137 mini-generator. When you click the *MCS – Internal* command the Parameter Settings Control toolbar updates to show a Dwell Time control. Use this control to assign the desired value to use for MCS dwell time. This is the amount of time that the UCS35 application spends populating each subsequent spectrum channel in the data graph. The total time of the run is equal to the conversion gain multiplied by the dwell time. Erase the current data graph window contents and click the start counts button. The UCS35 will begin counting incoming events for a duration given by the selected dwell time. Once this time period has

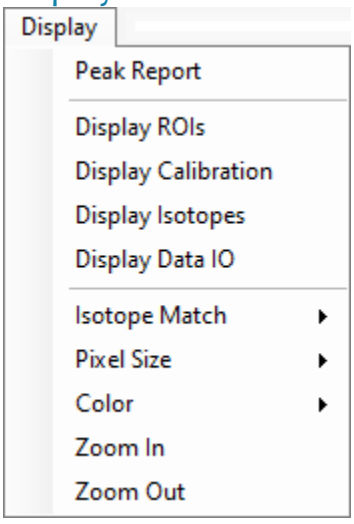
elapsed the counts get stored in the first channel location. Next, the counter resets back to zero and the cycle repeats with the counts getting stored in subsequent channels.

Click the *MCS – External* menu command to select the mode Multi-Channel Scaling (External). This mode is used for the case where you wish to use an external pulse generator such as a coincidence circuit. To use this mode it is necessary to bypass the on-board amplifier and level discriminators. Connect an external counts connector to the MCS IN BNC connector on the rear of the instrument. This MCS mode requires a positive TTL signal that is greater than 2.5 volts that lasts for a duration greater than 150 ns.

Click the *Mossbauer (Internal)* menu command to select the mode Mossbauer (Internal). This mode uses the instrument's internal pre-amplifier. Connect the signal into the INPUT BNC connector prior to using this command. When you click the *Mossbauer (Internal)* command the Parameter Settings Control toolbar updates the show a Dwell Time control and a Preset Passes control. Use these controls to assign the desired values to use for the Mossbauer dwell time and number of preset passes. The dwell ranges from 100 µsec to 8 seconds. Set the preset passes to the desired number of runs or leave it at zero to have the UCS35 run preset passes indefinitely.

Click the *Mossbauer (External)* menu command to select the mode Mossbauer (External). This mode does not use the instrument's internal pre-amplifier; it uses an external amplifier instead. Connect the external signal to the MCS IN BNC connector prior to using this command. When you click the *Mossbauer (External)* command the Parameter Settings Control toolbar updates the show a Dwell Time control and a Preset Passes control. Use these controls to assign the desired values to use for the Mossbauer dwell time and number of preset passes. The dwell ranges from 100 µsec to 8 seconds. Set the preset passes to the desired number of runs or leave it at zero to have the UCS35 run preset passes indefinitely.

Display



The **Display** menu allows the user to select from various display items. Click the *Peak Report* menu command to open a peak report Print dialog box. This box presents the user with an on-screen preview of the document before they actually print it. In step 1 of the print preview box the user selects the printer to use. In step 2 the user reviews the print preview of the peak report to decide whether or not to print the document. In this step the user either clicks the

printer icon to print the document or clicks the Close button to dismiss the Print dialog box without printing.

Click the *Display ROIs* menu command to toggle the display of the data graph ROIs on or off. As long as ROI display is on this menu item will display a checkmark indicating that ROIs will appear within the data graph window. The ROI colors display on the x-axis and underneath the channel data points.

Click the *Display Calibration* menu command to toggle the display of the data graph calibration on or off. As long as calibration is on this menu item will display a checkmark indicating that the calibration will appear within the data graph window. The calibration displays along the x-axis replacing the default channel units with the user-defined calibration units. Note that this menu item is selectable only if there is a calibration setting available for display within the UCS35 application.

Click the *Display Isotopes* menu command to toggle the display of selected isotope peaks on or off. How to select which isotopes to display is discussed later in this document under the *Isotope Match* menu command. As long as the isotope display is on this menu item will display a checkmark indicating that isotope peaks will appear within the data graph window.

Click the *Display Data IO* menu command to display the Data IO window. This window has a panel that shows a running list of all bi-directional data traffic that has occurred between the UCS35 application and the connected device. Buttons located at the bottom of the window allow the user to pause, copy, and clear the contents of the panel. The window also allows the user to send manual commands and queries to the connected device. Be careful when doing this as any manual command you send bypasses the normal flow of logic in the UCS35 application.

Click the *Isotope Match* menu command to display a popup isotope match menu. This popup allows the user to select which isotope peaks they want to see inside the data graph window. Click an isotope to toggle its display on or off within the data graph window. As long as an isotope's peaks are visible within the data graph window the popup displays a checkmark next to that isotope. The user may display peaks for as many isotopes as they want to within the popup. When you click the Isotope Library menu item the Isotope Selection dialog box appears. Use this dialog box to select multiple isotopes. Each isotope you select will be highlighted in the color blue. Once you have completed your isotope selection click the OK button. The dialog box disappears and the Isotope Match Menu popup updates to show the user-selected isotopes. Also, the data graph window updates to show the peaks for the user-selected isotopes. This menu remains visible until the user clicks *Close Isotope Match Menu* within the popup.

Click the *Pixel Size* menu command. This causes a cascade menu to appear. Use this menu to select the pixel point size to use for spectrum channel data displayed within the data graph window. Pixels point size can be set to 1, 2, or 3 pixels. The default size is 2.

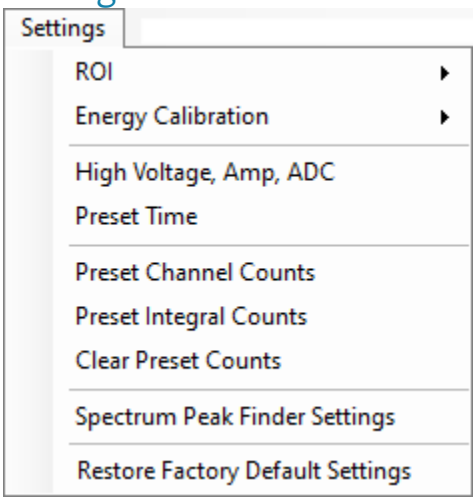
Click the *Color* menu command. This causes a cascade menu to appear. Use this menu to click the *ROI Colors* menu item. This causes ROI Colors dialog box to appear. This dialog box shows the default colors that will be used when assigning new ROIs. There are sixteen default colors. The user may change any one of these numbered ROI colors by clicking on its colored square. Doing this causes the Color selection dialog box to appear. From within this dialog box the user may select from any one of the basic colors they want to use to replace the color of the

selected ROI number. Alternatively, the user may use the *Define Custom Colors* menu button. Clicking this button causes the Color selection dialog box to expand to include a palette of colors from which to select. Click either the OK button or the Cancel button when you want to dismiss the Color selection dialog box. Doing this takes you back to the ROI Colors dialog box. Click either the Save button or the Cancel button when you want to dismiss the ROI Colors dialog box. Click the *Data Graph Colors* menu item. This causes the Data Graph Colors dialog box to appear. This dialog box shows the default colors that the UCS35 application uses when displaying the data graph window. The three colors shown are for the spectrum color, axes color, and grid lines color. It is recommended that you not change these default colors as it might make it harder to tell what you are looking at within the data graph window. Click either the Save button or the Cancel button when you want to dismiss the Data Graph Colors dialog box.

Click the *Zoom In* menu command. This causes the data graph window to redraw with the x-axis zoomed in. The zoom location is generally centered on whichever channel marker the user has previously selected with the mouse. The user selects a channel by mouse-clicking above it (and any data points visible in the graph) within the data graph window. A black tic mark appears along the top of the x-axis indicating the currently selected channel. This is the channel cursor. When the user clicks the *Zoom In* menu command the upper left corner of the data graph window updates to show the current zoom level. Each time the user zooms in the data graph window attempts to keep the channel marker centered within the window. Note that while zoomed in within the data graph window the user may slide the channel data displayed to the left or to the right. They do this by pressing the *Page Down* or *Page Up* keyboard keys. Press *Page Down* to slide the channel data to the right. Press *Page Up* to slide the channel data to the left.

Click the *Zoom Out* menu command. This causes the data graph window to redraw with the x-axis zoomed out. The zoom location is generally centered on whichever channel marker the user has previously selected with the mouse. When the user clicks the *Zoom Out* menu command the upper left corner of the data graph window updates to show the current zoom level. Each time the user zooms out the data graph window attempts to keep the channel marker centered within the window.

Settings



The **Settings** menu allows the user to assign various settings that control the UCS35 application. Click the *ROI* menu command. This causes a cascade menu to appear. Use this menu to click the *Set ROI* item. Doing this puts the data graph window into a momentary ROI creation mode. Click and hold the left mouse button at a channel location where no ROI currently exists. A black tic mark appears on the top of the x-axis indicating the currently selected channel. This is the channel cursor. The x-axis location you selected defines the beginning of a new ROI. Drag the mouse to the x-axis location at the end of the ROI. Notice that the channel cursor moves along the x-axis as you drag the mouse. Release the mouse button to generate a new ROI. If the new ROI is valid you will see a popup window appear asking whether you want to add this new region of interest to the ROI list. If the new ROI is invalid you will see a different popup window appear saying it cannot add the new region of interest. This happens because the new ROI would overlap with an existing ROI and this is not allowed. The data graph window returns to its normal mode of operation.

Click the *Delete ROI* menu item. Doing this causes a popup window to appear. If the channel cursor is located within an ROI the popup window will provide details about the ROI the cursor is inside of and ask whether you want to delete this ROI. Select Yes to delete the ROI. The data graph window will update to show that the deleted ROI no longer appears within the window. If the cursor is not located within an ROI at the time the user clicks to *Delete ROI* menu command the popup window that appears will advise the user of this fact and will ask the user to select an ROI to delete from within the Data Graph window and to try again.

Click the *Delete All ROIs* menu item. Doing this causes a popup window to appear asking you whether you want to delete all ROIs from the data graph window. If you select Yes here then be aware that this operation cannot be undone. After you select Yes the popup window disappears and the data graph window updates to show that there are no longer any ROIs in the data graph.

Click the Energy Calibration menu command. Doing this causes a cascade menu to appear. Use this menu to perform various energy calibration operations. The *Uncalibrate* menu item is selectable only if there is already a calibration in place within the data graph window. Select this menu item. Doing this causes a popup window to appear asking you whether you want to delete the current calibration from the data graph window. If you select *Yes* here then the data graph window will update to show that there is no longer a calibration for the channel data contained within the data graph window. The x-axis units will update to read *Channels* instead of the calibration units that were previously displayed there.

Click the *2 Point Calibrate* menu item. Doing this causes a *Set Energy Units* dialog box to appear. In the provided text box replace the default text with the name you want to use for the calibration units; for instance *keV*. Click the *Set* button to continue. This causes the Set Energy Units box to be replaced with a *Set Energy Point 1* dialog box. Use this box to enter a channel and an energy value to use as the first point in the calibration. It is recommended that prior to performing a 2 point calibration you should already have displayed within the data graph window a spectrum graph of a known radio-isotope sample. Make sure that the graph has sufficient data points to show at least two different peaks for the isotope. Use your knowledge of what the energy levels are for these two peaks and which channels the peaks occupy within the data graph window. Knowing this type within the *Set Energy Point 1* dialog box the channel and the energy for the first point. Note that the values you enter for channel and energy in this box are dynamically appear in the data graph window. Click the *Set* button. Doing this causes the *Set Energy Point 1* dialog box to be replaced with a *Set Energy Point 2* dialog box. Type within the

Set Energy Point 2 dialog box the channel and the energy for the second point. Click the *Set* button. Doing this causes the *Set Energy Point 2* dialog box to disappear. The x-axis within the data graph window updates to show this new calibration. As before any channel that the user selects with the mouse causes the channel marker to appear at that channel location. However, the x-axis value of that channel is now calculated from the 2 point calibration that has been applied to the data graph window. Also, the x-axis units have been updated to display the name the user gave for the calibration units. This calibration state remains in effect until such time as the user applies a new calibration to the data graph window or issues a command to uncalibrate the window.

Click the *3 Point Calibrate* menu item. As with performing a 2 point calibration doing this causes a *Set Energy Units* dialog box to appear. In the provided text box replace the default text with the name you want to use for the calibration units; for instance *keV*. Click the *Set* button to continue. This causes the Set Energy Units box to be replaced with a *Set Energy Point 1* dialog box. Use this box to enter a channel and an energy value to use as the first point in the calibration. It is recommended that prior to performing a 3 point calibration you should already have displayed within the data graph window a spectrum graph of a known radio-isotope sample. Make sure that the graph has sufficient data points to show at least three different peaks for the isotope. Use your knowledge of what the energy levels are for these three peaks and which channels the peaks occupy within the data graph window. Knowing this type within the *Set Energy Point 1* dialog box the channel and the energy for the first point. Note that the values you enter for channel and energy in this box dynamically appear in the data graph window. Click the *Set* button. Doing this causes the *Set Energy Point 1* dialog box to be replaced with a *Set Energy Point 2* dialog box. Type within the *Set Energy Point 2* dialog box the channel and the energy for the second point. Click the *Set* button. Doing this causes the *Set Energy Point 2* dialog box to be replaced with a *Set Energy Point 3* dialog box. Type within the *Set Energy Point 3* dialog box the channel and the energy for the third point. Click the *Set* button. Doing this causes the *Set Energy Point 3* dialog box to disappear. The x-axis within the data graph window updates to show this new calibration. As before any channel that the user selects with the mouse causes the channel marker to appear at that channel location. However, the x-axis value of that channel is now calculated from the 3 point calibration that has been applied to the data graph window. Also, the x-axis units have been updated to display the name the user gave for the calibration units. This calibration state remains in effect until such time as the user applies a new calibration to the data graph window or issues a command to uncalibrate the window.

Click the *Auto Calibrate* menu item. Doing this places the UCS35 application into an auto-calibration mode. In order to perform an auto-calibration it is required that a Cs-137 isotope source be located in the scintillation probe connected to the computer. The application pops up a message box that maintains current step information throughout the auto-calibration process. While in auto-calibration mode the application automatically runs through a series of count cycles seeking to determine the optimum combination of calibration settings for the known 32 keV and 662 keV energy peaks in the Cs-137 source. During auto-calibration the application makes automatic adjustments to its high voltage, coarse gain, and fine gain settings. Upon successful completion of an auto-calibration the message box changes to show that auto-calibration has finished and what the calibrated high voltage, coarse gain, and fine gain settings are. Also, the *Parameter Settings Control* toolbar has been updated to show these calibrated settings. As long as the user does not change any of these three parameter settings each

spectrum channel data point produced during a normal count cycle will be positioned such that the channel is the energy level (in keV).

Click the *High Voltage, Amp, ADC* menu command. This causes the High Voltage, Amperage, ADC Settings dialog box to appear. Within this dialog box the user may make adjustments to the high voltage, coarse gain, fine gain, conversion gain, low level discriminator, and high level discriminator. Changes made here do not take effect unless the user clicks the OK button. Clicking Cancel causes the dialog box to disappear without any changes taking effect.

Once the program is up and running it will be necessary to configure the system parameters for correct operation and calibration. Place a gamma emitting check source near the detector face. Cesium-137 (Cs-137) is a good choice. It has a peak at 662 keV. Click on **Settings**, then click on **High Voltage, Amp/ADC** menu command. Set the high voltage to the voltage as listed by the detector manufacturer. As an example, set the high voltage to positive 600 volts; click **ON**. ***DO NOT*** *exceed the maximum high voltage rating of the detector, usually 1200 volts.* Set the amplifier **COARSE GAIN** to 4, and set the **FINE GAIN** to 1 as a starting position. Click on **OK**, to set adjustments and exit the menu. **Start** the data acquisition and adjust the **amplifier gain** until the 662 keV peak is approximately mid-scale. Once the acquisition is started, you may enter the **Amp/HV/ADC** menu and make adjustments while viewing the spectrum. This will allow you to position the peak in the desired channels.

High Voltage may be entered directly in the text box or may be scrolled to the value desired. A warning will be issued if you attempt to input a value higher than 1200 volts, since this is the highest value that many probes can tolerate without damage.

Amplifier coarse gain may be set by clicking the radio-button next to the desired multiplier.

Amplifier fine gain may be directly entered as a multiplier value between 1.0 and 2.5 in 0.005 increments.

Conversion Gain represents the number of channels that will be sampled and displayed on the screen. Smaller values save as smaller files. The conversion gain default setting is maximum channels. This is preferred for most scintillation detector applications and generally no adjustment is required. For certain applications, such as alpha spectroscopy, it may be necessary to change this parameter to either 256, 512, 1024, 2048 or 4096 channels.

LLD and ULD, Lower Level Discriminator, and Upper Level Discriminator, allow the user to set a value between 0 and 1023 approximately that cuts off the input signal. The LLD is often used to block high-count signals (noise) in the low range that are not of interest. The ULD may be set up to 1023. Low level discrimination (LLD) may be scrolled or directly entered.

Upper level discrimination (ULD) may be scrolled or directly entered. An alternative method to change the LLD and ULD is to use the mouse to move the triangles under the X axis. Move the mouse over the triangle to be moved, press the left button, drag the triangle and release it where desired. The software will not allow the LLD and the ULD to be set outside appropriate ranges.

The ability to switch between positive and negative high voltage polarities is an add-on option.

Some detectors require a positive input polarity. This option is only available in PHA Amp In mode.

Amplifier Peaking Times of 1, 2, 4, or 8 microseconds are selectable in Amp In mode only. Peaking times longer than 1 microsecond are useful with solid state detectors such as Ge(Li) or HPGE detectors.

Click the *Preset Time* menu command. This causes the Preset Time dialog box to appear. This dialog box provides the user with a convenient place to assign live time and real time settings for use by the UCS35 application. Preset live time provides automatic correction for counting losses caused by system deadtime. System deadtime is the amount of time required by the system to process detector pulses. Any event which occurs during a pulse processing cycle is not counted by the system. To compensate for such losses the timer is automatically updated. When operating at excessively high count-rates the deadtime meter will indicate a high value and the real counting time may be more than doubled. Increasing the LLD setting might help reduce some high deadtime effects. Preset real time sets the counting timer to run for actual clocktime; it makes no attempt to correct for losses due to deadtime effects. Make the changes you want within the Preset Time dialog box for either live time or real time then click the OK button to apply the setting and dismiss the dialog box.

Click the *Preset Channel Counts* menu command. This causes the Preset Channel Counts dialog box to appear. This dialog box provides the user with a convenient place to assign a preset channel and preset channel counts settings. These two settings are automatically used when the user next starts a count cycle. For each update in counts in the data graph window the application checks the number of counts accumulated at the preset channel. As soon as the number of counts at that channel reaches the value assigned to the preset channel counts the count cycle stops. Due to the discreet manner in which the data graph window accumulates counts the final number of counts at the preset channel might be somewhat higher than the preset channel counts. In the case where the user leaves the preset channel set to zero and assigns a non-zero value to preset channel counts the data graph window automatically stops counting when any channel reaches the preset channel counts. To discontinue having the data graph window from using this mode of operation click the *Clear Current Channel Settings* button within the *Preset Channel Counts* dialog box.

Click the *Preset Integral Counts* menu command. This causes the Preset Integral Counts dialog box to appear. This dialog box provides the user with a convenient place to assign an ROI and integral (gross counts) settings. These two settings are automatically used when the user next starts a count cycle. For each update in counts in the data graph window the application checks the number of counts accumulated at the assigned ROI. As soon as the number of counts within that ROI reaches the value assigned to the integral setting the count cycle stops. Due to the discreet manner in which the data graph window accumulates counts the final number of counts at the preset channel might be somewhat higher than the preset channel counts. To discontinue having the data graph window from using this mode of operation click the *Clear Current Integral Settings* button within the *Preset Integral Counts* dialog box.

Click the *Clear Preset Counts* menu command. This disables both the preset channel counts and the preset integral counts settings applied earlier in this discussion. It also restores whichever ROI was selected prior to invoking either of these menu items. This puts the data graph window back into the state it was in before either of these menus items was invoked.

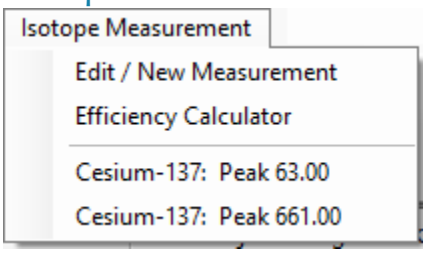
Click the *Spectrum Peak Finder Settings* menu command. This causes the Spectrum Peak Finder Settings dialog box to appear. This dialog provides the user with a convenient place to assign configuration settings that control how the peak finder goes about locating peaks within the spectrum data. There are two settings that the user may assign. A discussion of exactly what these settings mean and how to use them is beyond the scope of this document. It is recommended that the user leave these two settings set to their default values. They are summarized here:

- Peak Sensitivity 67%
- Min 8 Counts per Channel

Click the *Restore Factory Default Settings* menu command. This causes a message box to appear. If the High Voltage is turned off the message box asks the user whether they want to restore factory default settings for the connected device. This operation cannot be undone. The default settings are:

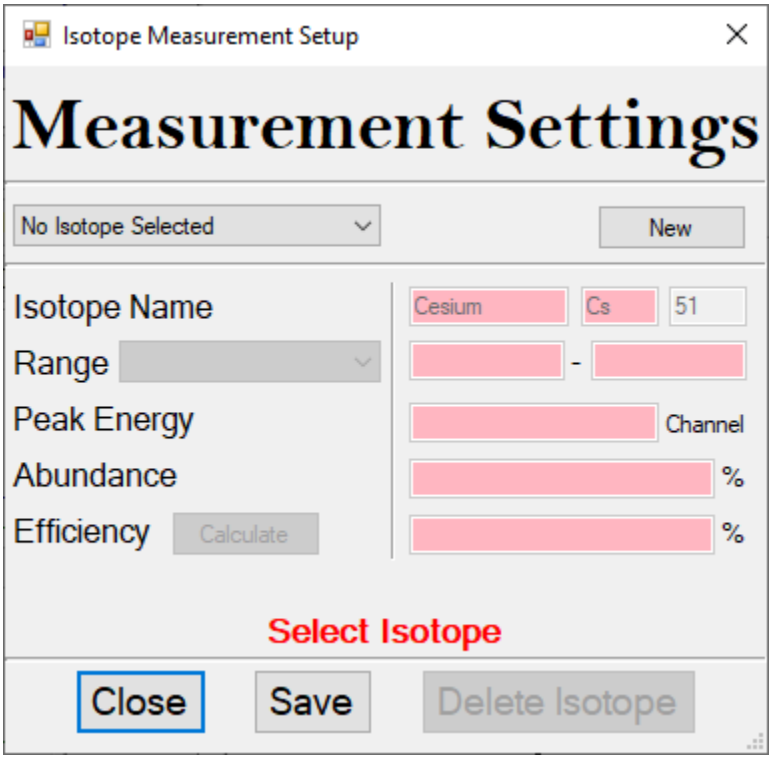
- Coarse Gain: 1
- Fine Gain: 1
- High Voltage: OFF
- Preset Real Time: 0
- Preset Live Time: 0
- Preset Integral ROI: 0
- Preset Integral Counts: 0
- Preset Passes: 0
- Lower Level Discriminator: 100
- Upper Level Discriminator: 1023
- PHA Mode: Internal Pre-Amplifier
- MCS Dwell Time: 10 ms
- Mossbauer Dwell Time: 100 umsec
- Voltage Polarity: Positive
- Input Voltage Polarity: Positive
- ROI Colors: Restore to default colors

Isotope Measurement



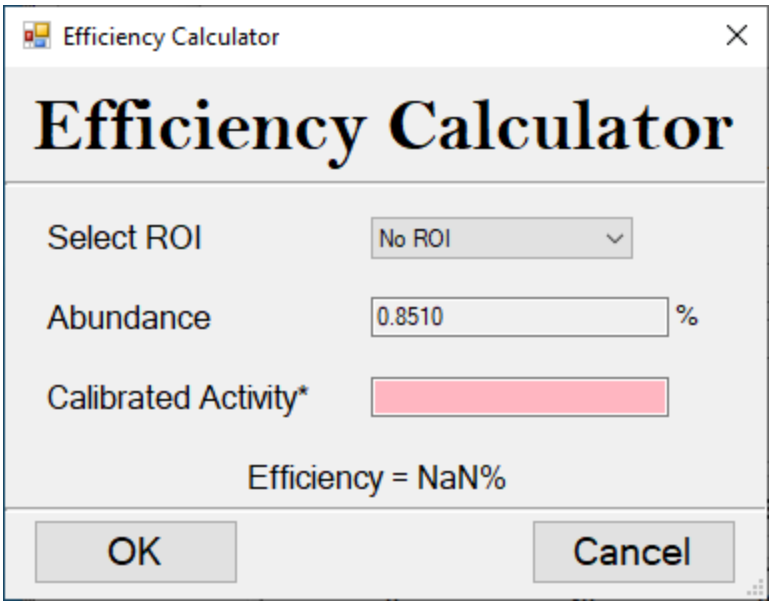
The **Isotope Measurement** menu allows the user to create and edit settings for isotopes. These settings associate the isotopes with energy level ranges, peak energy, abundance percentage, and efficiency. If the user plans to edit an existing isotope or to add a new isotope using this menu they should first define at least one ROI and generate a spectrum within the data graph window. This spectrum should exhibit the peaks of interest for the isotope being

edited or added. Click the Edit / New Measurement menu command. This causes the Isotope Measurement Setup dialog box to appear. See below:



Initially, no isotope is selected and the dialog box asks the user to select an isotope. The user does this by way of the dropdown box. The items shown in the dropdown box are from a library of isotopes that the UCS35 application maintains. Selecting an isotope from the dropdown box causes the isotope's details to appear in the body of the dialog box. From here the user can view or change the range, peak energy, abundance, and efficiency details for that isotope. Alternatively, the user can create an entry for a new isotope by clicking the New button near the top right corner of the dialog box. After confirming that the user wants to add a new isotope the dialog box updates to show the default details for the new isotope. The new isotope is saved to the library. The user may customize details of the new isotope to match details of the actual isotope the user wants to add. Prior to the user entering appropriate values into the boxes their background color are pink. This indicates that the current value is invalid and needs to be updated by the user. If there is at least one peak energy value contained within an ROI for the spectrum the user can automatically assign that peak with the highest number of counts to the isotope. The user does this by selecting the ROI from the Range dropdown menu. After a moment the dialog box will refresh and show the updated values for peak energy, lower range, and upper range for the isotope.

The Isotope Measurement Setup dialog box can calculate ROI efficiency. Click the Calculate button to bring up the *Efficiency Calculator* dialog box. See below:



To calculate ROI efficiency the app uses this formula:

```
efficiency = gross_counts / (known_activity * abundance * 37000 * live_time)
```

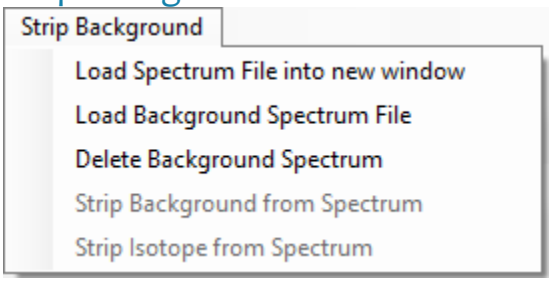
- where gross_counts = current gross counts for the ROI
- known_activity = Calibrated Activity entered by the user into the Efficiency Calculator
- abundance = Abundance entered into the Efficiency Calculator
- live_time = number of seconds the data graph was actively accumulating the spectrum data

Click the OK button to apply the abundance and efficiency values to the isotope and to close the *Efficiency Calculator* dialog box.

Within the Isotope Measurement Setup dialog box the user may remove an isotope from the library. They do this by first selecting the isotope in the dropdown menu, then clicking the *Delete Isotope* button. This causes a message box to appear asking them to confirm whether they want to delete the isotope. If they click the Yes button the isotope gets deleted. When the user is done they can click *Save* to save the updated isotopes to the library, then click *Close* to dismiss the dialog box.

Click the *Efficiency Calculator* menu command. This causes the Efficiency Calculator dialog box to appear. This is the same dialog box that appears when the user clicks the Calculate button within the Isotope Measurement Setup dialog box that was discussed above. Using the Efficiency Calculator here allows the user to obtain efficiency values for an ROI without having to first select an isotope. The efficiency value that gets calculated is for informational purposes and does not get saved to the isotope library.

Strip Background



The **Strip Background** menu allows the user to display previously saved spectrum files into either the main window or a new window within the UCS35 application. Additionally, the user may strip a previously saved background or isotope from the spectrum currently displayed in the main window of the UCS35 application.

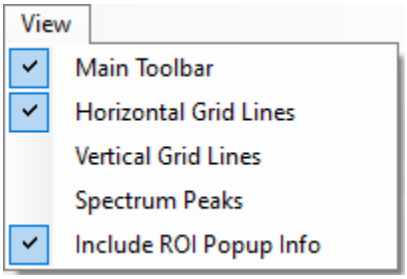
Click the *Load Spectrum File into new window* menu item. Doing this causes an Open file dialog box to appear. From here the user may select the desired spectrum file to display. Note that acceptable file types are *.spu* and *.spuASCII*. After selecting the file to display click the Open button from within the dialog box. After a moment a new main window appears on the screen. This new window contains the spectrum contained in the user-selected file. Note that even though this new window looks similar to the original main application window most of its GUI interface commands are disabled. This is because the new window is used to simply display the loaded spectrum file and nothing else. Once you are finished looking at the loaded spectrum file you may close the new window by clicking on the red X button located at the upper right corner of the window. Doing this causes a message box to appear that says "Are you sure you want to shut down the UCS35 software?" Clicking "Yes" closes only the new window; the original UCS35 application window remains unaffected.

Click the *Load Background Spectrum File* menu item. Doing this causes an Open file dialog box to appear. From here the user may select the desired spectrum file to display. Note that acceptable file types are *.spu* and *.spuASCII*. After selecting the file to display click the Open button from within the dialog box. After a moment the spectrum contained in the user-selected file appears within the DataGraph window of the main application.

Click the *Delete Background Spectrum* menu item. Doing this immediately removes the previously loaded background spectrum from within the DataGraph window of the main application. Note that it does not ask for you to confirm whether you want to remove the background spectrum.

The *Strip Background from Spectrum* and *Strip Isotope from Spectrum* menu option are only available if the user has already loaded a background spectrum file (see above) into the DataGraph window. The user loads the desired background spectrum into the DataGraph window and then clicks the Strip Background from Spectrum menu command. This subtracts the background spectrum from the currently displayed main spectrum. The portion that gets subtracted is based on a time adjustment to the data in the background file. For example if the current main spectrum was measured with 100 seconds live time and the background file was measured with 200 seconds live time, then the data in each column of the background file gets divided by 2 (200 seconds / 100 seconds) before it is subtracted from the current spectrum.

View



The **View** menu allows the user to specify which of several GUI items are visible within the main application window. The View menu will display a checkmark to the left of those GUI items that are currently visible.

Click the *Main Toolbar* menu item. Doing this causes the visibility of the main toolbar to toggle ON or OFF. Note that the main toolbar is located near the top of the main application window and contains a row of nine icons. It looks something like this:

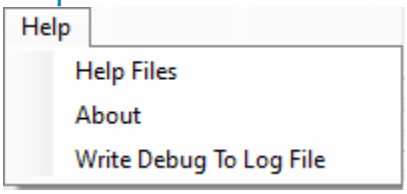
Click the *Horizontal Grid Lines* menu item. Doing this causes the horizontal grid lines in the DataGraph window to toggle ON or OFF.

Click the *Vertical Grid Lines* menu item. Doing this causes the vertical grid lines in the DataGraph window to toggle ON or OFF.

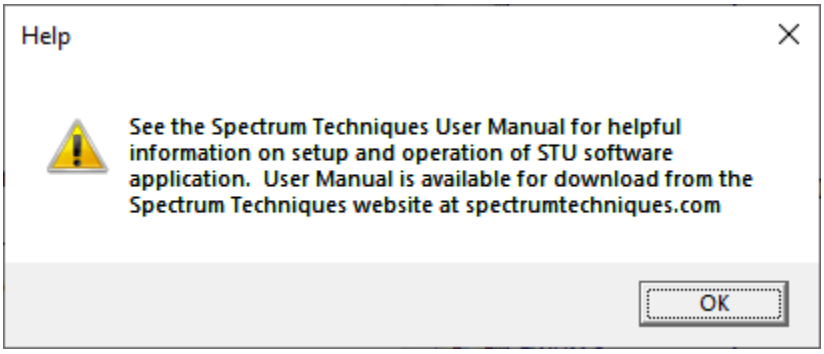
Click the *Spectrum Peaks* menu item. Doing this causes all peaks contained within the DataGraph window to toggle ON or OFF. As long as *Spectrum Peaks* is ON the DataGraph window will display the current *Peak Sensitivity* setting in the upper right hand corner of the windows. Note that the user can adjust the peak sensitivity through use of a slider bar located immediately below the *Peak Sensitivity* setting.

Click the *Include ROI Popup Info* menu item. Doing this causes ROI information in the DataGraph window to toggle ON or OFF. Note that in order for this ROI information to display it is necessary for the *Display ROIs* option within the DataGraph popup menu to already be enabled. Then whenever the mouse cursor becomes positioned within an ROI boundary, the DataGraph window will automatically display real-time information about the ROI including Net Counts, FWHM, FWTM, Gross Counts, and Centroid.

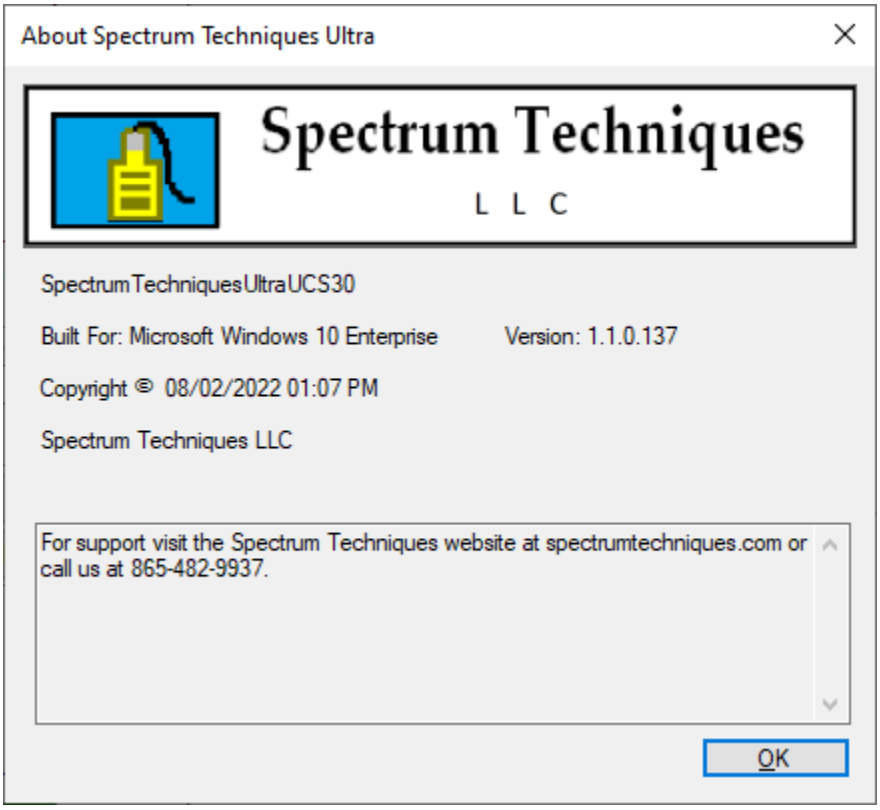
Help



The **Help** menu allows the user to display helpful information about the operation of the UCS35 application. Click the *Help Files* menu item. Doing this causes a help message box to appear temporarily on screen. See below:



Click the *About* menu item. Doing this causes an about message box to appear on screen. See below:



Click the *Write Debug To Log File* menu item. Doing this toggles ON or OFF the recording of real-time debugging information to be written to a log file. Note that as long as this option is enabled there will be a checkmark located to the left of this menu item. Also, the title bar of the main application window will contain the text *(Logging)* while logging is enabled. This is so you can tell at a glance whether the UCS35 application is currently performing logging. The log file is located in the folder

C:\ProgramData\Spectrum Techniques LLC\SpectrumTechniquesUltraUCS35\Log _Files. The files contained here are .txt files. Each .txt file contains detailed logging information for the current session of the UCS35 application.

Specifications

Hardware

Physical: Single instrument includes preamplifier, amplifier, detector high voltage, 4096-channel (maximum) multichannel analyzer with data memory, LLD and ULD. Fully compatible with many scintillation detectors and commercial tube bases.
Amplifier: On-board combination preamplifier/amplifier for use with scintillation detectors and PMTs. Computer controlled coarse and fine gain from x1 to x160.
ADC: Wilkinson type with 80 MHz clock and computer selected conversion gain of 4096, 2048, 1024, 512, or 256 channels. Direct input accepts pulse peaking times of 1 µsec. to 10 µsec. Includes dead-time correction when used in Livetime mode.
LLD & ULD: Lower Level- and Upper Level-discriminators. Independently computer controlled in 1-channel increments over entire input range.
Modes: MCA for pulse height analysis, or MCS for half-life decay or other time related studies.
Timers: Real-time or Live-time operation selectable in 1-second increments for PHA, or dwell times from 10 msec. to 600 seconds per channel in MCS mode.
Data Memory: On-board static RAM, 4096 channel (x) 3 Bytes for data, plus region-of-interest flag.
Deadtime: System dead-time is computed and displayed on screen during acquisition.
Power: AC to DC adapter 220/110V AC to 9V DC center pin positive, 1000mA.

Software

System: Operates under Windows 7 or better with 600 kb disk space for the executable file, 4 GB RAM (8 GB recommended), and compatible mouse.
Display: SVGA color graphics (1280x1024 recommended. Linear vertical scale adjusts from 64 to 16M and full range logarithmic display. Horizontal 4096 channels with reduction down to 128 channels.
Time Mode: Preset live-time or preset real-time selection. Both times are recorded and displayed.
ROIs: Multiple Regions-of Interest using color coding.
Integral: When cursor is in ROI, computes gross area, net area with end point averaging, centroid and FWHM.
Energy Cal: 2-point linear or 3-point quadratic converts cursor position reading directly to energy units. (Time units in MCS mode.)
Strip: Subtracts channel-by-channel time normalized data stored in File Mode. Overlays two saved spectra in File Mode
Smooth: 3-point smoothing of selected displayed data.
Control: Software control of High Voltage, Amplifier Gain, Lower and Upper level discriminators, and ADC Conversion Gain.
File: Save or load data file and header information in binary or spreadsheet compatible formats.
Print: Prints current screen display to Windows printer.
ROI File: Saves ROI data, centroid, FWHM, gross and net integrals, and header information in spreadsheet compatible format.
IsoMatch: Isotope library text file with peak markers and labeling for overlaying on spectrum for quick isotope identification. Library may be edited from Edit, IsoMatch pull down menu.

Warranty and Repair Information

Spectrum Techniques warrants products of our manufacture against defects in workmanship or material for a period of one year from date of shipment. We will repair or replace, at our option, any device that is deemed defective during this time. This warranty covers all replacement parts and labor. The device must be returned to our factory prepaid and we in turn will pay the cost of the return shipping.

The warranty does not cover damage caused by mishandling or misuse. GM tubes with broken windows are specifically excluded from this warranty. Accessory items not manufactured by Spectrum Techniques but supplied as part of our systems will be subject to the original manufacturer's warranty.

For warranty-repair information or return authorization, contact customer service at:

Spectrum Techniques
106 Union Valley Road
Oak Ridge, TN 37830
Tel: (865) 482-9937
Fax: (865) 483-0473
spectrumtechniques.com